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ABSTRACT

This Unified Sciences and Mathematics for Elementary Schools (USMES) unit challenges students to find ways of developing and maintaining a well-run classroom. The challenge is general enough to apply to many problem-solving situations in mathematics, science, social science, and language arts at any elementary school level (grades 1-8). The Teacher Resource Book for the unit is divided into five sections. Section I describes the USMES approach to student-initiated investigations of real problems, including a discussion of the nature of USMES "challenges." Section II provides an overview of possible student activities with comments on prerequisite skills, instructional strategies, suggestions when using the unit with primary grades, flow charts illustrating how investigations evolve from students' discussions of classroom management problems, and a hypothetical account of intermediate-level class activities. Section III provides documented events of actual class activities from grades 1/2, 3/4/5, 4, and 6. Section IV includes lists of "How To" cards and background papers, bibliography of non-USMES materials, and a glossary. Section V consists of charts identifying skills, concepts, processes, and areas of study learned as students become involved with classroom management investigations. (JN)

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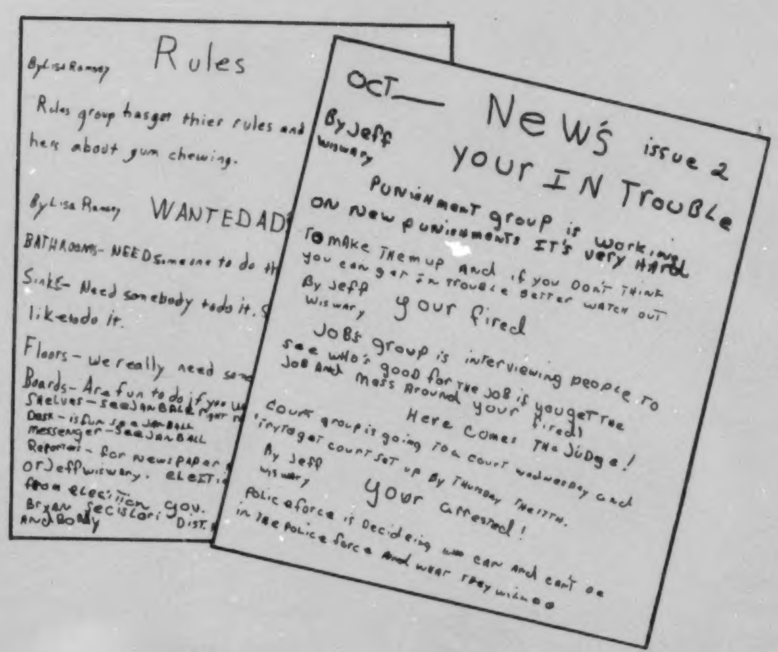
UNIFIED SCIENCES AND MATHEMATICS FOR ELEMENTARY SCHOOLS:
Mathematics and the Natural, Social, and Communications Sciences in
Real Problem Solving.

Classroom Management

Second Edition



By Lisa Ramsey
Rules

Rules group has got thier rules and here about gum chewing.

By Lisa Ramsey
WANTEDAD

BATHROOMS- NEED Someone to do th

Sinks- Need somebody todo it.

like todo it.

Floors- we really need so

Boards- Are fun to do if you w

Shelves- See Jan Ball right n

Desk- is fun see Jan Ball

Messenger- See Jan Ball

Reporter- for newspaper

or Jeff Wiswary. ELECTI

from election. you.

Bryan Secislori DIST.

And Body

OCT__ News issue 2

By Jeff Wiswary

your IN Trouble

Punishment group is working on new punishments It's very Hard to make them up and if you don't think you can get in trouble better watch out

By Jeff Wiswary

your fired

JOBS group is interviewing people to see who's good for the job if you get the job and mess around your fired!

Here Comes The Judge!

Court group is going to a court wednesday and tryto get court set up By Thursday the 17th.

By Jeff Wiswary

your arrested!

Police force is decideing who can and can't be in the police force and wear they will go

Education Development Center, Inc.
55 Chapel Street
Newton, MA 02160

Trial Edition

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CHALLENGE: FIND WAYS OF DEVELOPING AND MAINTAINING A WELL-RUN CLASSROOM.

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Preface

The USMES Project

Unified Sciences and Mathematics for Elementary Schools: Mathematics and the Natural, Social, and Communications Sciences in Real Problem Solving (USMES) was formed in response to the recommendations of the 1967 Cambridge Conference on the Correlation of Science and Mathematics in the Schools.* Since its inception in 1970, USMES has been funded by the National Science Foundation to develop and carry out field trials of interdisciplinary units centered on long-range investigations of real and practical problems (or "challenges") taken from the local school/community environment. School planners can use these units to design a flexible curriculum for grades kindergarten through eight in which real problem solving plays an important role.

Development and field trials were carried out by teachers and students in the classroom with the assistance of university specialists at workshops and at occasional other meetings. The work was coordinated by a staff at the Education Development Center in Newton, Massachusetts. In addition, the staff at EDC coordinated implementation programs involving schools, districts, and colleges that are carrying out local USMES implementation programs for teachers and schools in their area.

Trial editions of the following units are currently available:

- Advertising
- Bicycle Transportation
- Classroom Design
- Classroom Management
- Consumer Research
- Describing People
- Designing for Human Proportions
- Design Lab Design
- Eating in School
- Getting There
- Growing Plants
- Manufacturing
- Mass Communications
- Nature Trails
- Orientation
- Pedestrian Crossings
- Play Area Design and Use
- Protecting Property
- School Rules
- School Supplies
- School Zoo
- Soft Drink Design
- Traffic Flow
- Using Free Time
- Ways to Learn/Teach
- Weather Predictions

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*See *Goals for the Correlation of Elementary Science and Mathematics*, Houghton Mifflin Co., Boston, 1969.

USMES Resources

In responding to a long-range challenge, the students and teachers often have need of a wide range of resources. In fact, all of the people and materials in the school and community are important resources for USMES activities. In addition USMES provides resources for both teachers and students. A complete set of all the written materials comprise the USMES library, which should be available in each school using USMES units. These materials include--

1. *The USMES Guide*: This book is a compilation of materials that may be used for long-range planning of a curriculum that incorporates the USMES program. It describes the USMES project, real problem solving, classroom strategies, the Design Lab, the units, and the support materials as well as ways that USMES helps students learn basic skills.

2. *Teacher Resource Books* (one for each challenge): Each of these guides to using USMES units describes a broad problem, explains how students might narrow that problem to fit their particular needs, recommends classroom strategies, presents edited logs from teachers whose classes have worked on the unit, and contains charts that indicate basic skills, processes, and areas of study that students may learn and utilize.

3. *Design Lab Manual*: This guide helps teachers and administrators set up, run, and use a Design Lab--a place with tools and materials in which the students can build things they need for their work on USMES. A Design Lab may be a corner of a classroom, a portable cart, or a separate room. Because many "hands-on" activities may take place in the classroom, every USMES teacher should have a Design Lab Manual.

4. *"How To" Series*: These student materials provide information to students about specific problems that may arise during USMES units. The regular *"How To" Series* covers problems in measuring, graphing, data handling, etc., and is available in two versions--a series of

cartoon-style booklets for primary grades and a series of magazine-style booklets with more reading matter for upper grades. The *Design Lab "How To" Series* is available in two illustrated card versions--one for primary grades and one for upper grades. A complete list of the *"How To" Series* can be found in the *USMES Guide*.

5. Background Papers: These papers, correlated with the *"How To" Series*, provide teachers with information and hints that do not appear in the student materials. A complete list can be found in the *USMES Guide*.

6. Curriculum Correlation Guide: By correlating the twenty-six USMES units with other curriculum materials, this book helps teachers to integrate USMES with other school activities and lessons.

The preceding materials are described in brief in the USMES brochure, which can be used by teachers and administrators to disseminate information about the program to the local community. A variety of other dissemination and implementation materials are also available for individuals and groups involved in local implementation programs. They include *Preparing People for USMES: An Implementation Resource Book*, the USMES slide/tape show, the Design Lab slide/tape show, the Design Lab brochure, videotapes of classroom activities, a general report on evaluation results, a map showing the locations of schools conducting local implementation of USMES, a list of experienced USMES teachers and university consultants, and newspaper and magazine articles.

* * * * *

Because Tri-Wall was the only readily available brand of three-layered cardboard at the time the project began, USMES has used it at workshops and in schools; consequently, references to Tri-Wall can be found throughout the Teacher Resource Books. The addresses of suppliers of three-layered cardboard can be found in the Design Lab Manual.

Introduction

Using the Teacher Resource Book

When teachers try a new curriculum for the first time, they need to understand the philosophy behind the curriculum. The USMES approach to student-initiated investigations of real problems is outlined in section A of this Teacher Resource Book.

Section B starts with a brief overview of possible student activities arising from the challenge; comments on prerequisite skills are included. Following that is a discussion of the classroom strategy for USMES real problem-solving activities, including introduction of the challenge, student activity, resources, and Design Lab use. Subsequent pages include a description of the use of the unit in primary grades, a flow chart and a composite log that indicate the range of possible student work, and a list of questions that the teacher may find useful for focusing the students' activities on the challenge.

Because students initiate all the activities in response to the challenge and because the work of one class may differ from that undertaken by other classes, teachers familiar with USMES need to read only sections A and B before introducing the challenge to students.

Section C of this book is the documentation section. These edited teachers' logs show the variety of ways in which students in different classes have worked at finding a solution to the challenge.

Section D contains a list of the titles of relevant sets of "How To" Cards and brief descriptions of the Background Papers pertaining to the unit. Also included in section D is a glossary of the terms used in the Teacher Resource Book and an annotated bibliography.

Section E contains charts that indicate the comparative strengths of the unit in terms of real problem solving, mathematics, science, social science, and language arts. It also contains a list of explicit examples of real problem solving and other subject area skills, processes, and areas of study learned and utilized in the unit. These charts and lists are based on documentation of activities that have taken place in USMES classes. Knowing ahead of time which basic skills and processes are likely to be utilized, teachers can postpone teaching that part of their regular program until later in the year. At that time students can study them in the usual way if they have not already learned them as part of their USMES activities.

A. Real Problem Solving and USMES

> *If life were of such a constant nature that there were only a few chores to do and they were done over and over in exactly the same way, the case for knowing how to solve problems would not be so compelling. All one would have to do would be to learn how to do the few jobs at the outset. From then on he could rely on memory and habit. Fortunately--or unfortunately depending upon one's point of view--life is not simple and unchanging. Rather it is changing so rapidly that about all we can predict is that things will be different in the future. In such a world the ability to adjust and to solve one's problems is of paramount importance.**

Real Problem Solving

USMES is based on the beliefs that real problem solving is an important skill to be learned and that many math, science, social science, and language arts skills may be learned more quickly and easily within the context of student investigations of real problems. Real problem solving, as exemplified by USMES, implies a style of education which involves students in investigating and solving real problems. It provides the bridge between the abstractions of the school curriculum and the world of the student. Each USMES unit presents a problem in the form of a challenge that is interesting to children because it is both real and practical. The problem is real in several respects: (1) the problem applies to some aspect of student life in the school or community, (2) a solution is needed and not presently known, at least for the particular case in question, (3) the students must consider the entire situation with all the accompanying variables and complexities, and (4) the problem is such that the work done by the students can lead to some improvement in the situation. This expectation of useful accomplishment provides the motivation for children to carry out the comprehensive investigations needed to find some solution to the challenge.

The level at which the children approach the problems, the investigations that they carry out, and the solutions that they devise may vary according to the age and ability of the children. However, real problem solving involves them, at some level, in all aspects of the problem-solving process: definition of the problem; determination of the important factors in the problem; observation; measurement; collection of data; analysis of the data using graphs, charts, statistics, or whatever means the students can find; discussion; formulation and trial of suggested solutions; clarification of values; decision making; and communications of findings to others. In addition, students become more inquisitive, more cooperative in working with others, more critical in their thinking, more self-reliant, and more interested in helping to improve social conditions.

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*Kenneth B. Henderson and Robert E. Pingry, "Problem-Solving in Mathematics," in *The Learning of Mathematics: Its Theory and Practice,* Twenty-first Yearbook of the National Council of Teachers of Mathematics (Washington, D.C.: The Council, 1953), p. 233.

The USMES Approach

To learn the process of real problem solving, the students must encounter, formulate, and find some solution to complete and realistic problems. The students themselves, not the teacher, must analyze the problem, choose the variables that should be investigated, search out the facts, and judge the correctness of their hypotheses and conclusions. In real problem-solving activities, the teacher acts as a coordinator and collaborator, not an authoritative answer-giver.

The problem is first reworded by students in specific terms that apply to their school or community, and the various aspects of the problem are discussed by the class. The students then suggest approaches to the problem and set priorities for the investigations they plan to carry out. A typical USMES class consists of several groups working on different aspects of the problem. As the groups report periodically to the class on their progress, new directions are identified and new task forces are formed as needed. Thus, work on an USMES challenge provides students with a "discovery-learning" or "action-oriented" experience.

Real problem solving does not rely solely on the discovery-learning concept. In the real world people have access to certain facts and techniques when they recognize the need for them. The same should be true in the classroom. When the students find that certain facts and skills are necessary for continuing their investigation, they learn willingly and quickly in a more directed way to acquire these facts and skills. Consequently, the students should have available different resources that they may use as they recognize the need for them, but they should still be left with a wide scope to explore their own ideas and methods.

Certain information on specific skills is provided by the sets of USMES "How To" Cards. The students are referred only to the set for which they have clearly identified a need and only when they are unable to proceed on their own. Each "How To" Cards title clearly indicates the skill involved--"How to Use a Stopwatch," "How to Make a Bar Graph Picture of Your Data," etc. (A complete list of the "How To" Cards can be found in Chapter IX of the USMES Guide.)

Another resource provided by USMES is the Design Lab or its classroom equivalent. The Design Lab provides a central location for tools and materials where devices may be constructed and tested without appreciably disrupting other classroom activities. Ideally, it is a separate room with space for all necessary supplies and equipment and work space for the children. However, it may be as small as a corner of the classroom and may contain only a few tools and supplies. Since the benefits of real problem solving can be obtained by the students only if they have a means to follow up their ideas, the availability of a Design Lab can be a very important asset.

Optimally, the operation of the school's Design Lab should be such as to make it available to the students whenever they need it. It should be as free as possible from set scheduling or programming. The students use the Design Lab to try out their own ideas and/or to design, construct, test, and improve many devices initiated by their responses to the USMES challenges. While this optimum operation of the Design Lab may not always be possible due to various limitations, "hands-on" activities may take place in the classroom even though a Design Lab may not be available. (A detailed discussion of the Design Lab can be found in Chapter VI of the USMES Guide, while a complete list of "How To" Cards covering such Design Lab skills as sawing, gluing, nailing, soldering, is contained in Chapter IX.)

Work on all USMES challenges is not only sufficiently complex to require the collaboration of the whole class but also diverse enough to enable each student to contribute according to his/her interest and ability. However, it should be noted that if fewer than ten to twelve students from the class are carrying out the investigation of a unit challenge, the extent of their discovery and learning can be expected to be less than if more members of the class are involved. While it is possible for a class to work on two related units at the same time, in many classes the students progress better with just one.

The amount of time spent each week working on an USMES challenge is crucial to a successful resolution of the problem. Each challenge is designed so that the various investigations will take from thirty to forty-five hours, depending on the age of the children, before some solution to the problem is found and some action is taken on the results of the investigations. Unless sessions are held at least two or three times a week, it is difficult for the children to maintain their interest and momentum and to become involved intensively with the challenge. The length of each session depends upon the age level of the children and the nature of the challenge. For example, children in the primary grades may proceed better by working on the challenge more frequently for shorter periods of time, perhaps fifteen to twenty minutes, while older children may proceed better by working less frequently for much longer periods of time.

Student interest and the overall accomplishments of the class in finding and implementing solutions to the challenge indicate when the class's general participation in unit activities should end. (Premature discontinuance of work on a specific challenge is often due more to waning interest on the part of the teacher than to that of the students.) However, some students may continue work on a voluntary basis on one problem, while the others begin to identify possible approaches to another USMES challenge.

Importance of the Challenge

Although individual (or group) discovery and student initiation of investigations is the process in USMES units, this does not imply the constant encouragement of random activity. Random activity has an important place in children's learning, and opportunities for it should be made available at various times. During USMES activities, however, it is believed that children learn to solve real problems only when their efforts are focused on finding some solution to the real and practical problem presented in the USMES challenge. It has been found that students are motivated to overcome many difficulties and frustrations in their efforts to achieve the goal of effecting some change or at least of providing some useful information to others. Because the children's commitment to finding a solution to the challenge is one of the keys to successful USMES work, it is extremely important that the challenge be introduced so that it is accepted by the class as an important problem to which they are willing to devote a considerable amount of time.

The challenge not only motivates the children by stating the problem but also provides them with a criterion for judging their results. This criterion--if it works, it's right (or if it helps us find an answer to our problem, it's a good thing to do)--gives the children's ideas and results a meaning within the context of their goal. Many teachers have found this concept to be a valuable strategy that not only allows the teacher to respond positively to all of the children's ideas but also helps the children themselves to judge the value of their efforts.

Role of the Teacher

With all of the above in mind, it can be said that the teacher's responsibility in the USMES strategy for open classroom activities is as follows:

1. Introduce the challenge in a meaningful way that not only allows the children to relate it to their particular situation but also opens up various avenues of approach.

2. Act as a coordinator and collaborator. Assist, not direct, individuals or groups of students as they investigate different aspects of the problem.

3. Hold USMES sessions at least two or three times a week so that the children have a chance to become involved in the challenge and carry out comprehensive investigations.

4. Provide the tools and supplies necessary for initial hands-on work in the classroom or make arrangements for the children to work in the Design Lab.

5. Be patient in letting the children make their own mistakes and find their own way. Offer assistance or point out sources of help for specific information (such as the "How To" Cards) only when the children become frustrated in their approach to the problem. Conduct skill sessions as necessary.

6. Provide frequent opportunities for group reports and student exchanges of ideas in class discussions. In most cases, students will, by their own critical examination of the procedures they have used, improve or set new directions in their investigations.

7. If necessary, ask appropriate questions to stimulate the students' thinking so that they will make more extensive and comprehensive investigations or analyses of their data.

8. Make sure that a sufficient number of students (usually ten to twelve) are working on the challenge so that activities do not become fragmented or stall.

Student success in USMES unit activities is indicated by the progress they make in finding some solution to the challenge, not by following a particular line of investigation nor by obtaining specified results. The teacher's role in the USMES strategy is to provide a classroom atmosphere in which all students can, in their own way, search out some solution to the challenge.

USMES in the Total School Program

Today many leading educators feel that real problem solving (under different names) is an important skill to be learned. In this mode of learning particular emphasis is placed on developing skills to deal with real problems rather than the skills needed to obtain "correct" answers to contrived problems. Because of this and because of the interdisciplinary nature of both the problems and the resultant investigations, USMES is ideal for use as an important part of the elementary school program. Much of the time normally spent in the class on the traditional approaches to math, science, social science, and language arts skills can be safely assigned to USMES activities. In fact, as much as one-fourth to one-third of the total school program might be allotted to work on USMES challenges. Teachers who have worked with USMES for several years have each succeeding year successfully assigned to USMES activities the learning of a greater number of traditional skills. In addition, reports have indicated that students retain for a long time the skills and concepts learned and practiced during USMES activities. Therefore, the time normally spent in reinforcing required skills can be greatly reduced if these skills are learned and practiced in the context of real problem solving.

Because real problem-solving activities cannot possibly cover all the skills and concepts in the major subject areas, other curricula as well as other learning modes (such as "lecture method," "individual study topics," or programmed instruction) need to be used in conjunction with USMES in an optimal education program. However, the other instruction will be enhanced by the skills, motivation, and understanding provided by real problem solving, and, in some cases, work on an USMES challenge provides the context within which the skills and concepts of the major subject areas find application.

In order for real problem solving taught by USMES to have an optimal value in the school program, class time should be apportioned with reason and forethought, and the sequence of challenges investigated by students during their years in elementary school should involve them in a variety of skills and processes. Because all activities are initiated by students in response to the challenge, it is impossible to state unequivocally which activities will take place. However, it is possible to use the documentation of activities that have taken place in USMES trial classes to schedule instruction on the specific skills and processes required by the school system. Teachers can postpone the traditional way of teaching the skills that might come up in work on an USMES challenge until later in the year. At that time students can learn the required skills in the usual way if they have not already learned them during their USMES activities.

These basic skills, processes, and areas of study are listed in charts and lists contained in each Teacher Resource Book. A teacher can use these charts to decide on an overall allocation of class time between USMES and traditional learning in the major subject disciplines. Examples of individual skills and processes are also given so that the teacher can see beforehand which skills a student may encounter during the course of his investigations. These charts and lists may be found in section E.

Ways In Which USMES Differs From Other Curricula

As the foregoing indicates, USMES differs significantly from other curricula. Real problem solving develops the problem-solving ability of students and does it in a way (learning-by-doing) that leads to a full understanding of the process. Because of the following differences, some teacher preparation is necessary. Some teachers may have been introduced by other projects to several of the following new developments in education, but few teachers have integrated all of them into the new style of teaching and learning that real problem solving involves.

1. New Area of Learning--Real problem solving is a new area of learning, not just a new approach or a new content within an already-defined subject area. Although many subject-matter curricula

include something called problem solving, much of this problem solving involves contrived problems or fragments of a whole situation and does not require the cognitive skills needed for the investigation of real and practical problems. Learning the cognitive strategy required for real problem solving is different from other kinds of learning.

3. Interdisciplinary Education--Real problem solving integrates the disciplines in a natural way; there is no need to impose a multi-disciplinary structure. Solving real and practical problems requires the application of skills, concepts, and processes from many disciplines. The number and range of disciplines are unrestricted and the importance of each is demonstrated in working toward the solution of practical problems.

3. Student Planning--To learn the process of problem solving, the students themselves, not the teacher, must analyze the problem, choose the variables that should be investigated, search out the facts, and judge the correctness of the hypotheses and conclusions. In real problem-solving activities the teacher acts as a coordinator and collaborator, not as an authoritative source of answers.

4. Learning-by-Doing--Learning-by-doing, or discovery learning as it is sometimes called, comes about naturally in real problem solving since the problems tackled by each class have unique aspects; for example, different lunchrooms or pedestrian crossings have different problems associated with them and, consequently, unique solutions. The challenge, as defined in each situation, provides the focus for the children's hands-on learning experiences, such as collecting real data; constructing measuring instruments, scale models, test equipment, etc.; trying their suggested improvements; and (in some units) preparing reports and presentations of their findings for the proper authorities.

5. Learning Skills and Concepts as Needed--Skills and concepts are learned in real problem solving

as the need for them arises in the context of the work being done, rather than having a situation imposed by the teacher or the textbook being used. Teachers may direct this learning when the need for it arises, or students may search out information themselves from resources provided.

6. Group Work--Progress toward a solution to a real problem usually requires the efforts of groups of students, not just individual students working alone. Although some work may be done individually, the total group effort provides good opportunities for division of labor and exchange of ideas among the groups and individuals. The grouping is flexible and changes in order to meet the needs of the different stages of investigation.

7. Student Choice--Real problem solving offers classes the opportunity to work on problems that are real to them, not just to the adults who prepare the curriculum. In addition, students may choose to investigate particular aspects of the problem according to their interest. The variety of activities ensuing from the challenge allows each student to make some contribution towards the solution of the problem according to his or her ability and to learn specific skills at a time when he or she is ready for that particular intellectual structure.

B. General Papers on Classroom Management

1. OVERVIEW OF ACTIVITIES

Challenge:

Find ways of developing and maintaining a well-run classroom.

Possible Class Challenges:

How can we make the class run smoother?

How can we improve the daily class schedule?

How can we keep the room neat and running smoothly?

Students usually have opinions on ways the teacher should and should not run his/her classroom. For example, many teachers have been accused of having favorites because the same children always seem to be chosen as messengers, paper passers, etc. Given an opportunity to assist the teacher in managing the room, children become very motivated and enthusiastic.

The challenge may easily be introduced to the class at the beginning of the school year when no class routine has yet been established. In other cases, classes may become involved with the challenge when papers cannot be found, when groups cannot work effectively due to the lack of time, or after the class has had a difficult time working with a substitute teacher.

In discussing the challenge the class may list possible problem areas in the room. Some of these areas may include classroom jobs, rules, scheduling, noise, organization, and distribution of papers. The children may begin by dividing into groups to observe the present classroom procedures for a period of time. During this period the children may record the jobs that the teacher and children do, the number of times during the day children cannot find what they want, the time spent on each subject, etc.

In analyzing the data through graphs and charts, the children may identify new areas to investigate before drawing up their initial plans for change. The class may then choose one or two urgent problems to tackle first. One group may then conduct a survey in order to seek suggestions and criticisms from the class. Further revisions are made before trial implementation of the plan takes place. During the trial implementation period the children collect and analyze data in order to assess the effectiveness of their plan. Revisions and surveys are once again made before the final plan is put into effect.

The children's interest in developing and maintaining a well-run classroom may extend into the management of other areas found in some USMES units such as Using Free Time, Eating in School, School Rules, School Supplies, and Design Lab Design.

Although many of the activities in the Classroom Management unit may require skills and concepts new to the children, there is no need for preliminary work on these skills and concepts because the children can learn them when the need arises. In fact, children learn more quickly and easily when they see a need to learn. Consider counting: whereas children usually learn to count by rote, they can, through USMES, gain a better understanding of counting by learning or practicing it within real contexts. In working on Classroom Management, children also learn and practice graphing, measuring, working with decimals, and dividing. Although dividing seems necessary to compare fractions or ratios, primary children can make comparisons graphically; sets of data can also be compared graphically or by subtracting medians (half-way values). Furthermore, instead of using division to make scale drawings, younger children can convert their measurements to spaces on graph paper. Division may be introduced during calculation of percentages, averages, or unit costs.

2. CLASSROOM STRATEGY FOR CLASSROOM MANAGEMENT

The Classroom Management unit centers on a challenge--a statement that says, "Solve this problem." Its success or failure in a classroom depends largely on (1) the relevance of the problem for the students and (2) the process by which they define and accept the challenge. If the children see the problem as a real one, they will be committed to finding a solution; they will have a focus and purpose for their activities. If the students do not think the problem affects them, their attempts at finding solutions will likely be disjointed and cursory.

The Classroom Management challenge--"Find ways of developing and maintaining a well-run classroom"--is general enough to apply to many situations. Students in different classes define and reword the challenge to fit their particular situation and thus arrive at a specific class challenge. For example, one class worked on reducing the noise level in the room. Several other classes investigated ways to keep the classroom neat and organized.

The Process of Introducing the Challenge

Given that a problem exists, how can a teacher, without being directive, help the students identify the challenge that they will work on as a group? There is no set method because of variations among teachers, classes, and schools and among the USMES units themselves. However, USMES teachers have found that certain general techniques in introducing the challenge are helpful.

One such technique is to turn a discussion of some recent event toward the challenge. For example, a Classroom Management challenge may arise when students complain that they cannot complete their work in time because they cannot find papers, resources, or supplies in the room.

> *After deciding that there were "bugs" in the classroom, second graders in a first/second-grade class immediately identified the problem of paper organization among the first graders. The second graders complained that every time the teacher worked with them, the first graders interrupted them because they were unable to locate their written instructions. The class discussed this problem and everyone agreed that some sort of box in which to put the papers would help, and they decided upon mailboxes.*

> *A Classroom Management challenge arose in one third-grade class after the school principal came to the class for the third time to reprimand them for their terrible behavior with teacher aides and specialists. The class felt bad and agreed that they wished to do something to make their classroom run more smoothly and to make it a better place in which to learn.*

Sometimes work on another challenge, such as School Rules, Classroom Design, Using Free Time, or Ways to Learn/Teach, may lead to a Classroom Management challenge.

> *One sixth-grade class had been working on a Classroom Design challenge of making the classroom a better place in which to learn. The students were pleased with the several physical changes that had been made and naturally were concerned with how they could keep the room clean. They decided that classroom jobs were necessary and set up a system for distributing jobs and encouraging people to do their jobs.*

When children encounter a problem that leads to a challenge that is related to Classroom Management, one group of children may begin work on this second challenge while the rest of the class continues with the first challenge. However, there should be at least ten to twelve students working on any one challenge; otherwise, the children's work may be fragmented or superficial or may break down completely.

A Classroom Management challenge may also evolve from a discussion of a specific topic being studied by the class. For example, a class may be studying about how government systems work. The students may then wish to establish legislative and judicial systems in the classroom to deal with the ineffective rules and regulations.

Sometimes the discussion of a broad problem may encompass the challenges of several related units. For example, the problem of confusion on the first day of school may lead to a discussion of the possible causes of this problem and then to the investigation of one of several challenges, such as Classroom Management, School Rules, Mass Communications, Getting There, or Orientation.

An experienced USMES teacher is usually willing to have the children work on any one of the several challenges that may arise during the discussion of a broad problem. While this approach gives the children the opportunity to select the challenge they are most interested in investigating, it does place on the teacher the additional responsibility of being prepared to act as a resource person for whichever challenge is chosen.

Classroom experience has shown that children's progress on a Classroom Management challenge may be poor if the teacher and students do not reach a common understanding of what their challenge is before beginning work on it. Having no shared focus for their work, the children will lack the motivation inherent in working together to solve a real problem. As a result, they may quickly lose interest.

A similar situation occurs if the teacher, rather than ensuring that the children have agreed upon a challenge, merely assigns a series of activities. Although the teacher may see how these activities relate to an overall goal, the children may not.

An overall Classroom Management challenge was not discussed first in one second/third-grade class. Rather, the two teachers themselves identified classroom problems and asked for a committee to resolve each one. The class as a whole, then, was involved with a problem only when a committee reported on its progress.

Initial Work on the Challenge

Once a class has decided to work on a Classroom Management challenge, USMES sessions should be held several times a week, but they need not be rigidly scheduled. When sessions are held after long intervals, students often have difficulty remembering exactly where they were in their investigations and their momentum diminishes.

When students begin work on their particular challenge, they discuss and list possible ways to resolve the problem, such as finding a fair way to divide the classroom chores or an efficient way to store classroom papers and other materials. Often, this procedure is combined with or followed by preliminary observations and/or opinion surveys.

One fourth-grade class identified the overall problem of classroom noise. Before tackling the problem, they made some preliminary observations to determine the times during the day when the room was very noisy. They also experimented a little with ways to measure noise level.

Next, the class sets priorities for the tasks they consider necessary to complete their plans. Often a class divides into small groups to carry out tasks. As various groups complete their work, their members join other groups or form new groups to work on additional tasks.

Although they worked in a team with fifty-five intermediate children, teachers in one class faced the problem of too many groups working simultaneously on different aspects of the Classroom Management challenge. Some of the groups included the following:

1. *election (to set up and run all class elections)*
2. *rules and punishment (to make and revise class rules; to set punishments)*
3. *court (to try people who break class rules)*
4. *police force (to issue warnings on rules violations)*
5. *scheduling*
6. *newspaper (to keep the class informed of what was going on in all the groups)*

7. *jobs (to keep room neat and running smoothly)*
8. *pollution (to keep room clean and to lessen the noise level)*

This situation was found to be extremely difficult to manage; the groups began to work independently, and class discussions were so long that they ended with no one listening to the group reports.

Refocusing on the Challenge

As the children work on their challenge, their attention should, from time to time, be refocused on it so that they do not lose sight of their overall goal. Refocusing is particularly important with younger children because they have a shorter attention span. Teachers find it helpful to hold periodic class discussions that include group reports. Such sessions help the students review what they have accomplished and what they still need to do in order to carry out their proposed plans. These discussions also provide an opportunity for students to participate both in evaluating their own work and in exchanging ideas with their classmates. (Another consequence of having too many groups is that not every group can be given enough time to report to the class, thereby increasing the possibility that the children's efforts will overlap unnecessarily.)

Resources for Work on the Challenge

When the children try to decide on solutions before collecting and analyzing enough data or encounter difficulties during their investigations, an USMES teacher helps out. For example, to encourage the students to assess the present situation and to identify and list problems in order of urgency, the teacher may ask them, "What are our present classroom rules and procedures?" Examples of other nondirective, thought-provoking questions may be found in section B6 of this resource book.

The teacher may also refer students to the "How To" Cards which provide information about specific skills, such as drawing graphs or analyzing data. If many students, or even the entire class, need help in particular areas, such as using fractions, the teacher should conduct skill sessions as these needs arise. (Background Papers provide teachers with additional information on general topics applicable to most challenges.)

USMES teachers can also assist students by making it possible for them to carry out tasks involving hands-on activities. If the children need to collect data or make purchases, such as lumber, outside of the school, the teacher can help with supervision. If the children's tasks require them to design and construct items, the teacher should make sure that they have access to a Design Lab.

Valuable as it is, a Design Lab is not necessary to begin work on a Classroom Management challenge. The lab is used only when needed, and this need may not arise during early work on the challenge.

> *One first/second-grade class spent several weeks in the classroom working on their Classroom Management challenge before needing to use the Design Lab. During this time the children drew, revised, and voted on designs of spinners which were to be used in selecting bathroom/hall monitors.*

To carry out construction activities in schools without Design Labs, students may scrounge or borrow tools and supplies from parents, local businesses, or other members of the community.

At times some classes may not use the Design Lab at all; the extent to which the Design Lab is used varies with different classes and different units because the children themselves determine the direction of the investigations and because construction activities are more likely to occur in some units than in others.

> *In setting up a system to distribute classroom jobs and to reward students when jobs were completed, one sixth-grade class did not use the school's Design Lab. The only item that was needed to implement their plans was paper money which they made with ditto masters.*

Culminating Activities

Student investigations generally continue until the children have agreed upon and implemented some solution to their problem. They may reduce classroom disruptions because of a paper organizer they have constructed, or they may eliminate arguments over the distribution of class chores with some device, such as a spinner.

One fourth-grade class was successful in reducing slightly the noise level in the classroom with their egg-carton wall hangings, standing walls, and desk carrels.

After the plan or change has been in effect for a period of time the class evaluates it. If they feel that the change has satisfactorily met their challenge, they then turn their attention to other concerns.

3. USE OF CLASSROOM MANAGEMENT IN THE PRIMARY GRADES

Children in the primary grades may make significant progress with the Classroom Management challenge of finding ways to maintain a smoothly running classroom. Although their entry level to the challenge and their sophistication with the investigation will certainly be different from that of older children, they will be able to propose possible solutions, collect and interpret data, and take effective action to meet their challenge.

Past experience has shown that small children are always eager to share their experiences. In order to take advantage of this enthusiasm a teacher might wait for an incident to occur in the classroom before he/she introduces the challenge. A child may complain that the same children are picked to be hallway monitors or a whole class activity may be stalled because four or five children cannot find their papers on their desks. These or similar incidents provide a basis for a lively discussion of other classroom problems and a list will soon evolve. The children may then review each problem and agree to work upon the most urgent ones first.

With young children the teacher might find it beneficial in the beginning for the whole class to work on one problem at a time. Gradually, as the children become more able to follow through on their proposed plans, the teacher might encourage the class to divide the various aspects of the problem among small groups. The small groups would then present their findings to the class for discussion. This sharing experience not only provides for the opportunity to practice oral skills, but also allows for the exchange of ideas. Other language arts skills are learned as children write job descriptions or make posters.

After working on a problem for a while, the children often discover that not everyone agrees with the same plans or designs. To gather individual opinions, the children may decide to ask everyone certain questions--in effect, to conduct a survey. The survey may be conducted within the room to determine, for example, preference of mailbox styles. The children compile simple questions and organize an efficient way to administer the survey.

Tallying and graphing are easily introduced to primary children as they see the need to organize and make pictures of their information. After the children were unable to compare the number of votes (raised hands) for each opinion, one first/second-grade class made a bar graph tally using the children's names. The names of the seventeen children who voted to change the classroom procedures were listed on one side of the board, and on the other side were listed the names of those six children who were satisfied with the existing room procedures. By actually seeing that one column was taller than the other, the class became convinced that most of the children wished to change the existing classroom setup.

The Classroom Management unit also provides opportunities for children to become involved in measurement. Children usually see the need for some sort of a unit of measure when they realize that visual approximations are difficult to remember and to compare. In the first/second-grade class that constructed mailboxes the children soon realized that in order for all the mailboxes to be the same size some sort of standard measuring device was necessary. A meter stick was obtained and the class agreed upon mailbox dimensions. Some primary classes have made measuring instruments using their own units of measure. The children learned by experience that as long as everyone uses the same unit of measure, the resulting measurements can be meaningfully compared. In addition to measuring distances, the children may also measure time, e.g., the time required for certain jobs or the time spent on certain activities.

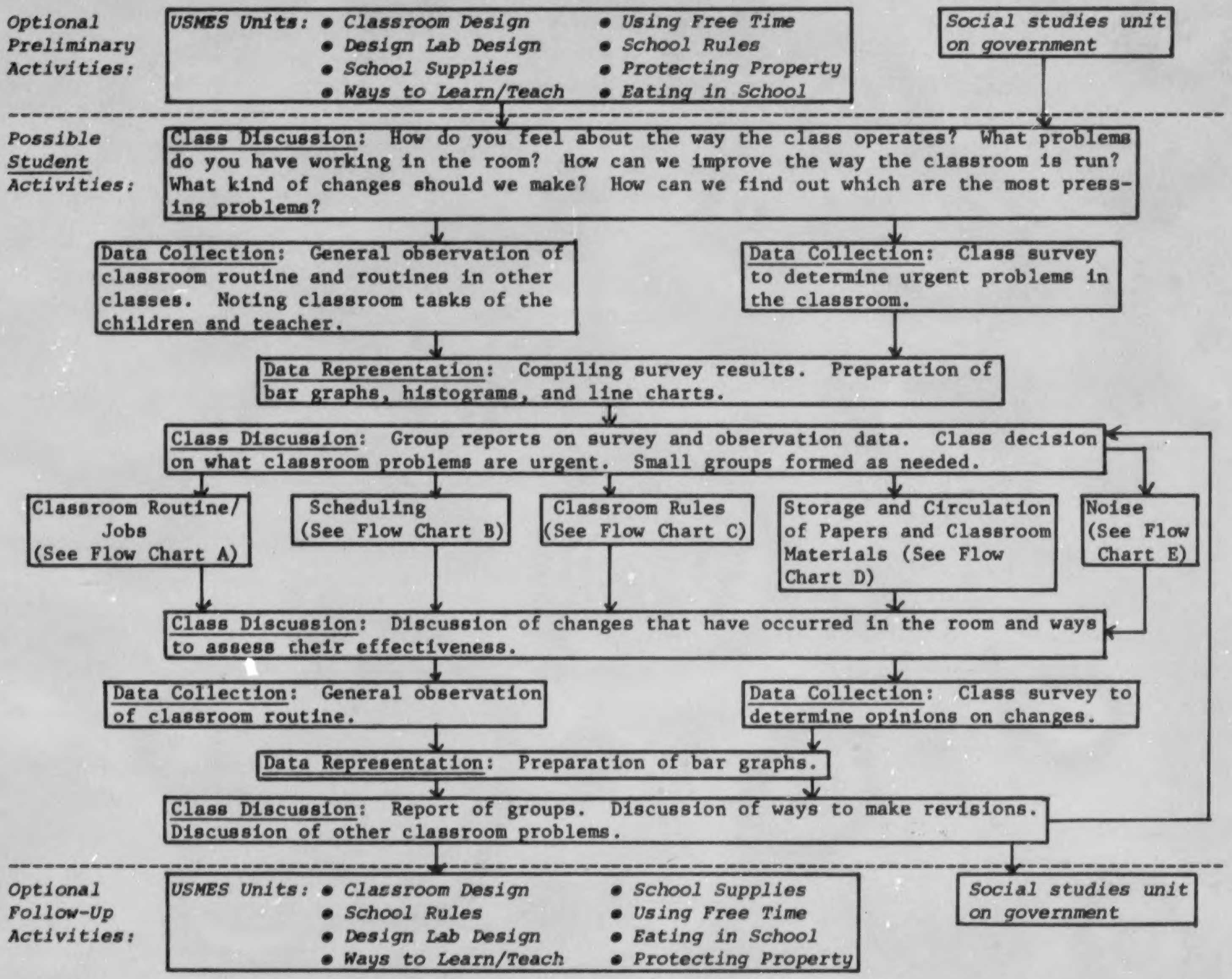
In working on the Classroom Management challenge children may want to construct items that can be used to organize classroom supplies. Experience in many schools has shown that primary children are able to work in the Design Lab and are able to use the power tools with some adult assistance. Children working on USMES challenges have designed and built such things as tables, boxes, and even sandals from Tri-Wall or lumber.

4. FLOW CHART

The following flow charts present some of the student activities--discussions, observations, calculations, constructions--that may occur during work on a Classroom Management challenge. Because each class will choose its own approach to the challenge, the sequences of events given here represent only a few of the many possible variations. Furthermore, no one class is expected to undertake all the activities listed.

The flow charts are not lesson plans and should not be used as such. Instead, they illustrate how comprehensive investigations evolve from the students' discussion of a Classroom Management problem.

Challenge: Find ways of developing and maintaining a well-run classroom.



Optional Preliminary Activities:

USMES Units:
- *Classroom Design*
- *Design Lab Design*
- *School Supplies*
- *Ways to Learn/Teach*
- *Using Free Time*
- *School Rules*
- *Protecting Property*
- *Eating in School*

Social studies unit on government

Possible Student Activities:

Class Discussion: How do you feel about the way the class operates? What problems do you have working in the room? How can we improve the way the classroom is run? What kind of changes should we make? How can we find out which are the most pressing problems?

Data Collection: General observation of classroom routine and routines in other classes. Noting classroom tasks of the children and teacher.

Data Collection: Class survey to determine urgent problems in the classroom.

Data Representation: Compiling survey results. Preparation of bar graphs, histograms, and line charts.

Class Discussion: Group reports on survey and observation data. Class decision on what classroom problems are urgent. Small groups formed as needed.

Classroom Routine/ Jobs (See Flow Chart A)

Scheduling (See Flow Chart B)

Classroom Rules (See Flow Chart C)

Storage and Circulation of Papers and Classroom Materials (See Flow Chart D)

Noise (See Flow Chart E)

Class Discussion: Discussion of changes that have occurred in the room and ways to assess their effectiveness.

Data Collection: General observation of classroom routine.

Data Collection: Class survey to determine opinions on changes.

Data Representation: Preparation of bar graphs.

Class Discussion: Report of groups. Discussion of ways to make revisions. Discussion of other classroom problems.

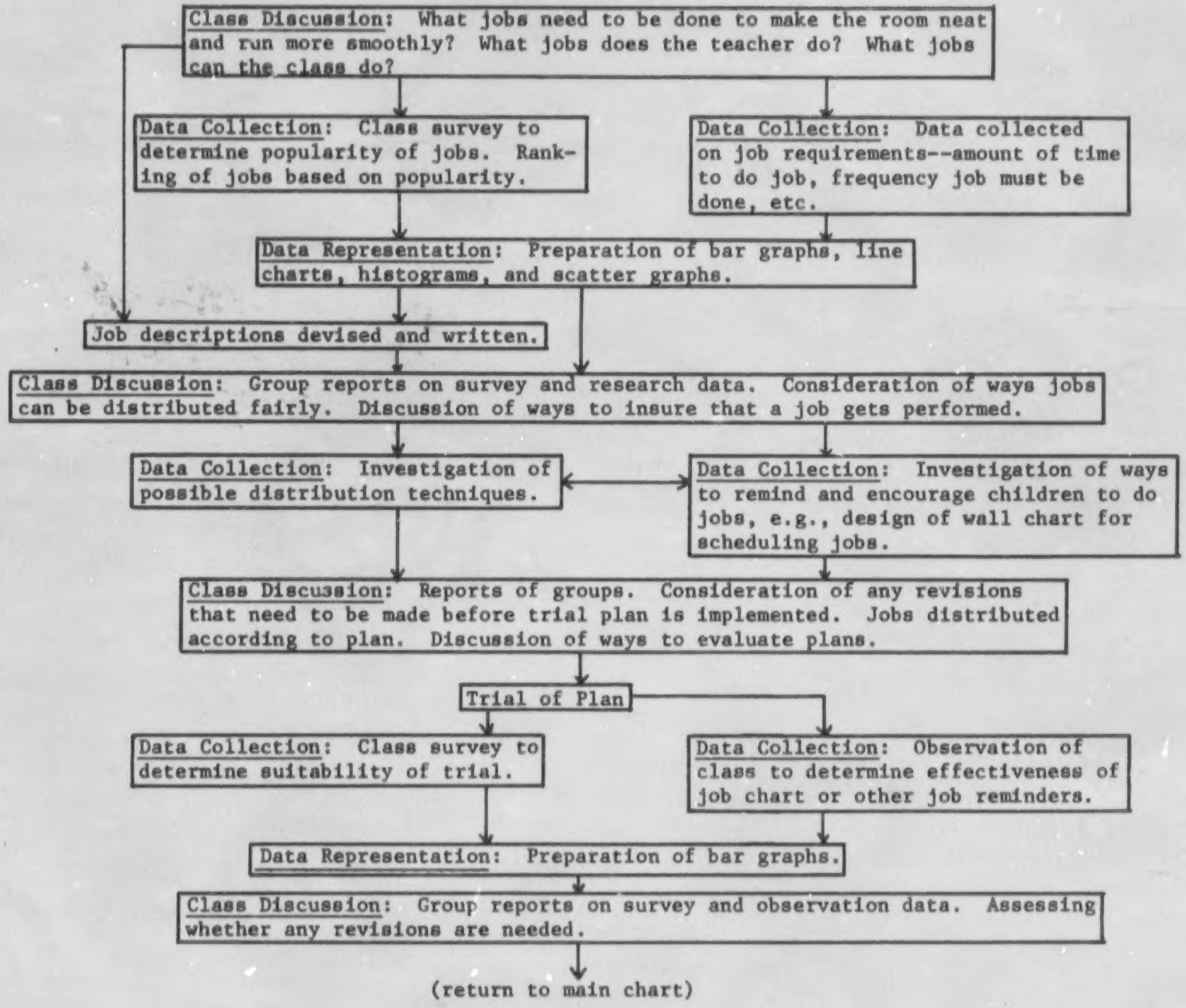
Optional Follow-Up Activities:

USMES Units:
- *Classroom Design*
- *School Rules*
- *Design Lab Design*
- *Ways to Learn/Teach*
- *School Supplies*
- *Using Free Time*
- *Eating in School*
- *Protecting Property*

Social studies unit on government

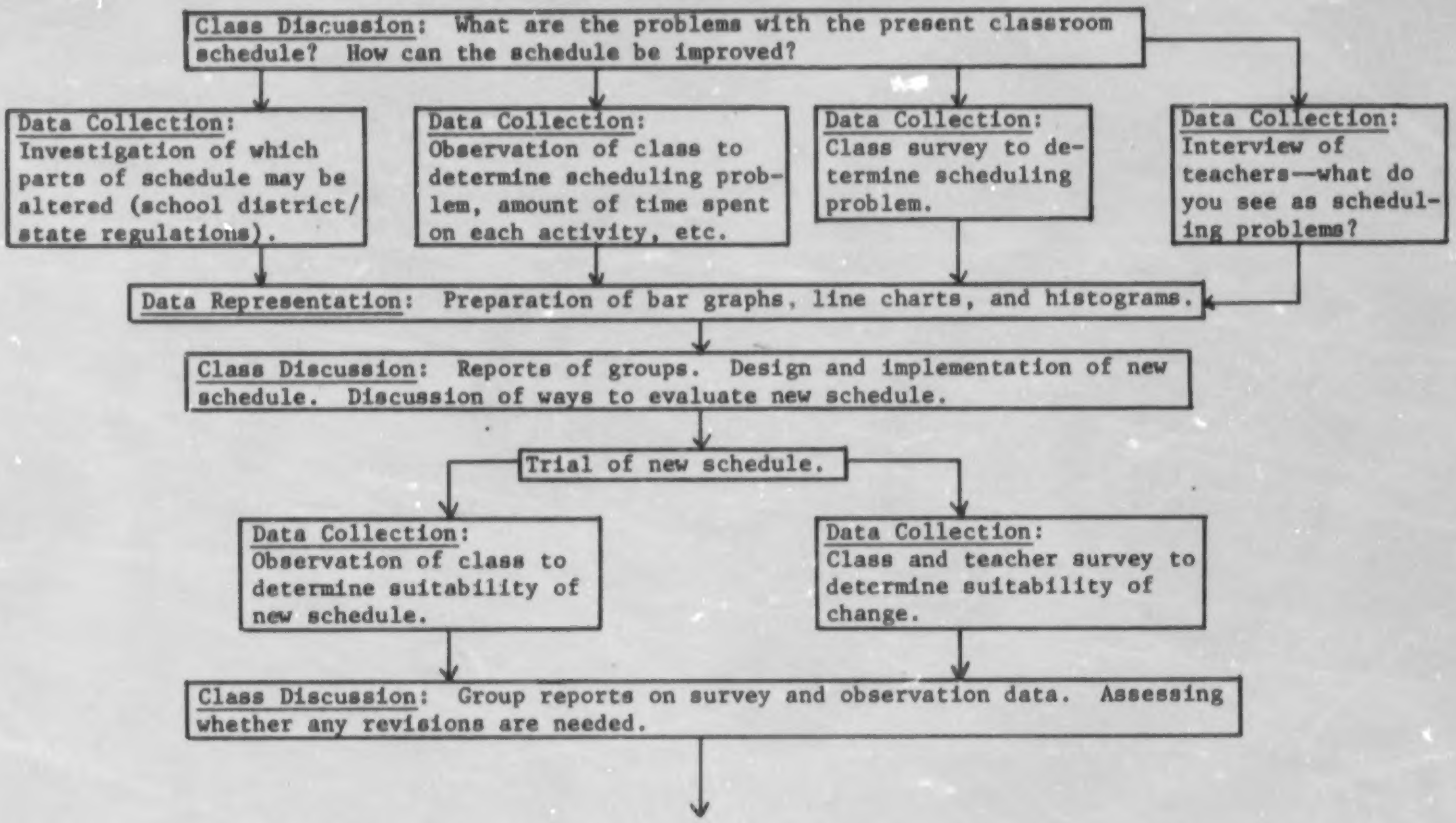
FLOW CHART A

Classroom Routine/Jobs


Class Discussion: What jobs need to be done to make the room neat and run more smoothly? What jobs does the teacher do? What jobs can the class do?
Data Collection: Class survey to determine popularity of jobs. Ranking of jobs based on popularity.
Data Collection: Data collected on job requirements--amount of time to do job, frequency job must be done, etc.
Data Representation: Preparation of bar graphs, line charts, histograms, and scatter graphs.
Job descriptions devised and written.
Class Discussion: Group reports on survey and research data. Consideration of ways jobs can be distributed fairly. Discussion of ways to insure that a job gets performed.
Data Collection: Investigation of possible distribution techniques.
Data Collection: Investigation of ways to remind and encourage children to do jobs, e.g., design of wall chart for scheduling jobs.
Class Discussion: Reports of groups. Consideration of any revisions that need to be made before trial plan is implemented. Jobs distributed according to plan. Discussion of ways to evaluate plans.
Trial of Plan
Data Collection: Class survey to determine suitability of trial.
Data Collection: Observation of class to determine effectiveness of job chart or other job reminders.
Data Representation: Preparation of bar graphs.
Class Discussion: Group reports on survey and observation data. Assessing whether any revisions are needed.
(return to main chart)

FLOW CHART B

Scheduling



Class Discussion: What are the problems with the present classroom schedule? How can the schedule be improved?

Data Collection: Investigation of which parts of schedule may be altered (school district/state regulations).

Data Collection: Observation of class to determine scheduling problem, amount of time spent on each activity, etc.

Data Collection: Class survey to determine scheduling problem.

Data Collection: Interview of teachers—what do you see as scheduling problems?

Data Representation: Preparation of bar graphs, line charts, and histograms.

Class Discussion: Reports of groups. Design and implementation of new schedule. Discussion of ways to evaluate new schedule.

Trial of new schedule.

Data Collection: Observation of class to determine suitability of new schedule.

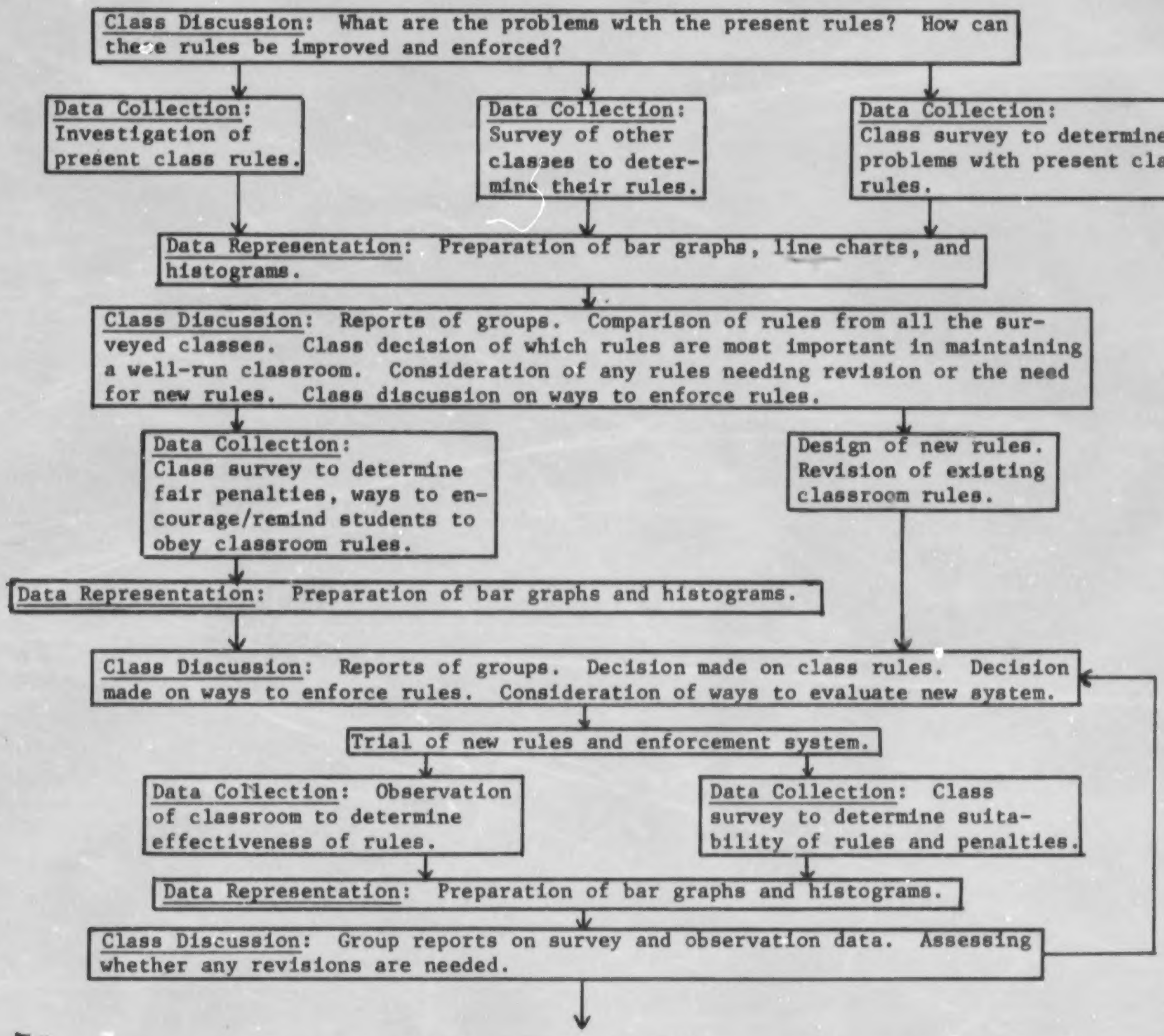
Data Collection: Class and teacher survey to determine suitability of change.

Class Discussion: Group reports on survey and observation data. Assessing whether any revisions are needed.

(return to main chart)

FLOW CHART C

Classroom Rules



Class Discussion: What are the problems with the present rules? How can these rules be improved and enforced?

Data Collection: Investigation of present class rules.

Data Collection: Survey of other classes to determine their rules.

Data Collection: Class survey to determine problems with present class rules.

Data Representation: Preparation of bar graphs, line charts, and histograms.

Class Discussion: Reports of groups. Comparison of rules from all the surveyed classes. Class decision of which rules are most important in maintaining a well-run classroom. Consideration of any rules needing revision or the need for new rules. Class discussion on ways to enforce rules.

Data Collection: Class survey to determine fair penalties, ways to encourage/remind students to obey classroom rules.

Design of new rules. Revision of existing classroom rules.

Data Representation: Preparation of bar graphs and histograms.

Class Discussion: Reports of groups. Decision made on class rules. Decision made on ways to enforce rules. Consideration of ways to evaluate new system.

Trial of new rules and enforcement system.

Data Collection: Observation of classroom to determine effectiveness of rules.

Data Collection: Class survey to determine suitability of rules and penalties.

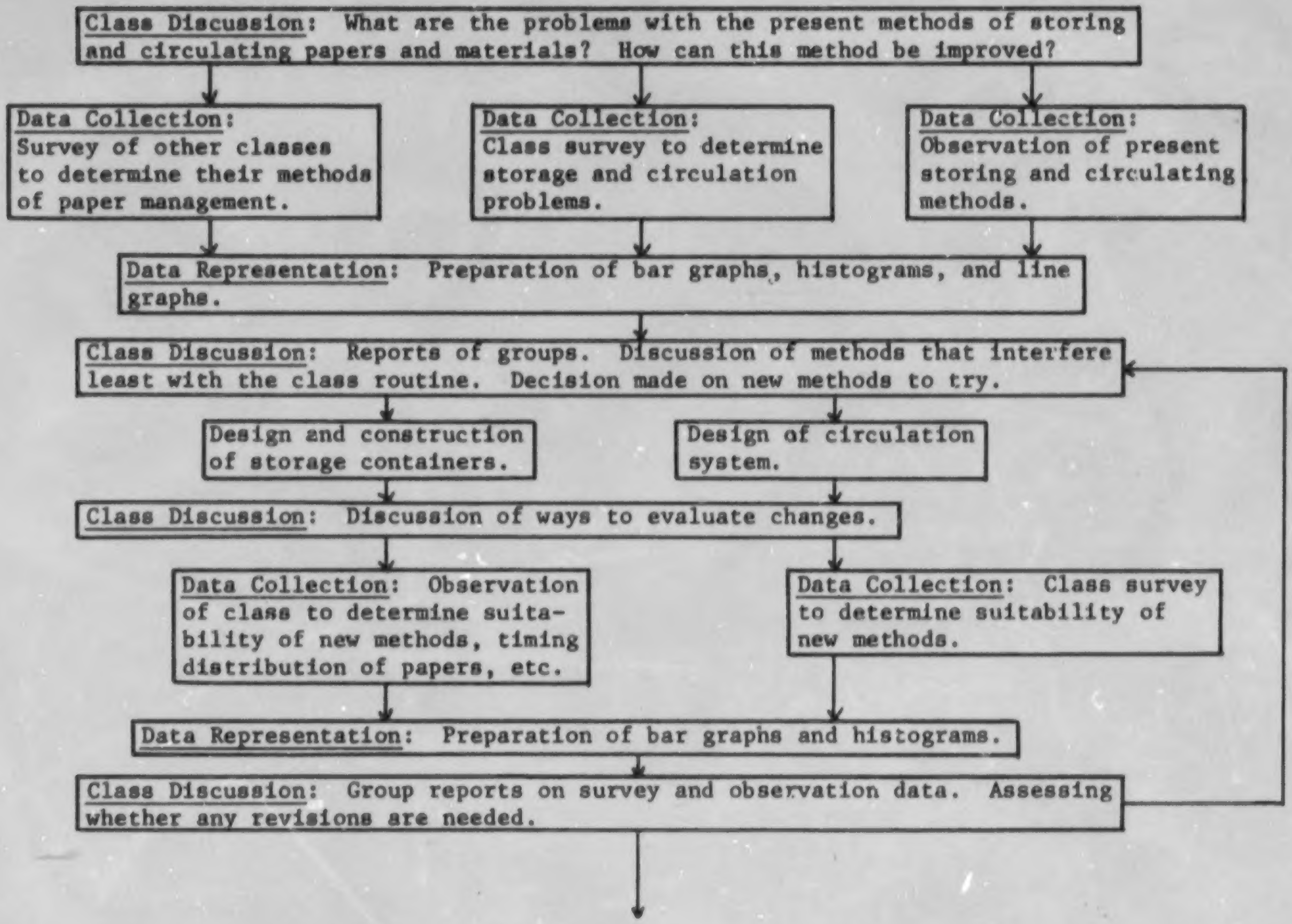
Data Representation: Preparation of bar graphs and histograms.

Class Discussion: Group reports on survey and observation data. Assessing whether any revisions are needed.

(return to main chart)

FLOW CHART D

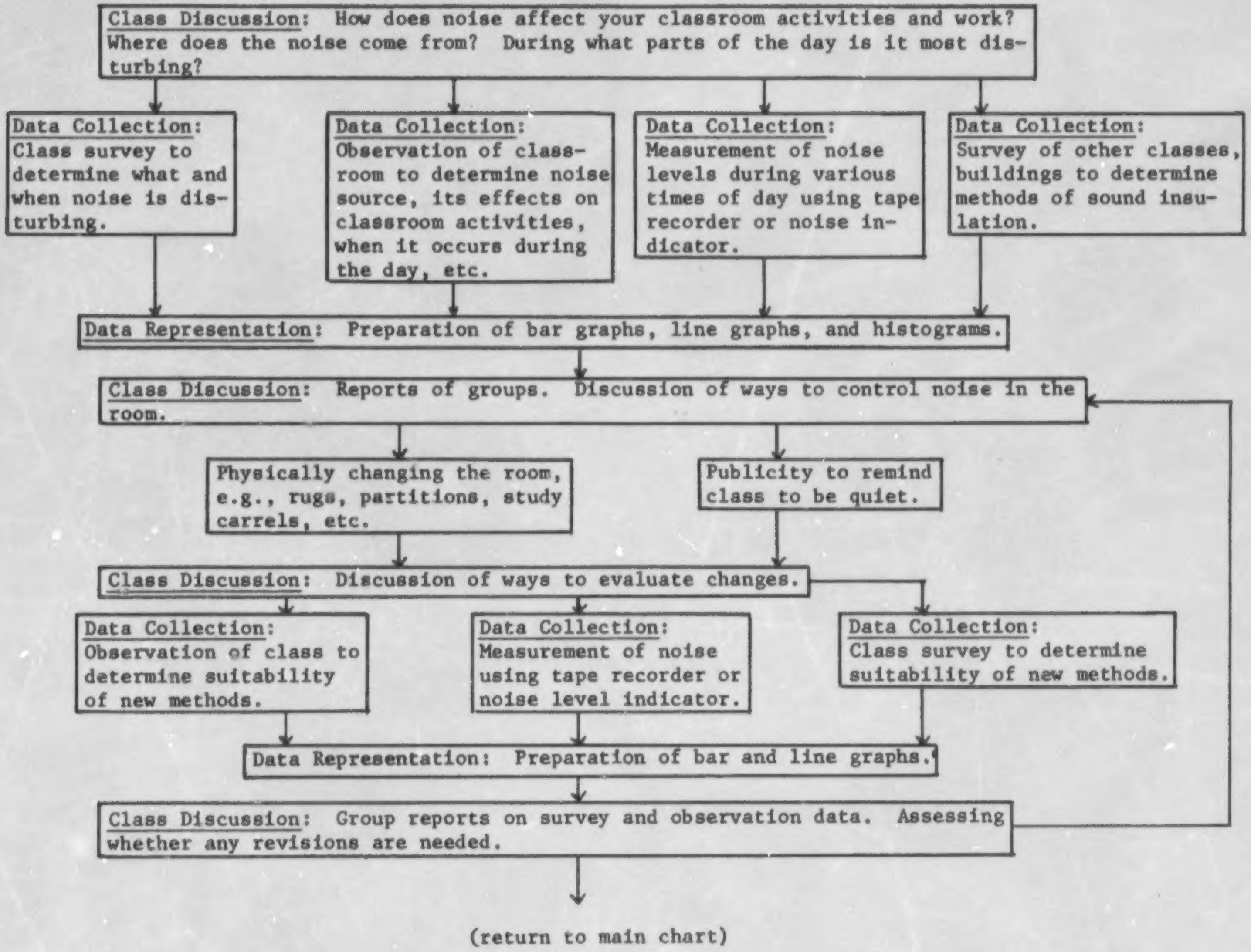
Storage and Circulation of Classroom Papers and Materials


Class Discussion: What are the problems with the present methods of storing and circulating papers and materials? How can this method be improved?
Data Collection: Survey of other classes to determine their methods of paper management.
Data Collection: Class survey to determine storage and circulation problems.
Data Collection: Observation of present storing and circulating methods.
Data Representation: Preparation of bar graphs, histograms, and line graphs.
Class Discussion: Reports of groups. Discussion of methods that interfere least with the class routine. Decision made on new methods to try.
Design and construction of storage containers.
Design of circulation system.
Class Discussion: Discussion of ways to evaluate changes.
Data Collection: Observation of class to determine suitability of new methods, timing distribution of papers, etc.
Data Collection: Class survey to determine suitability of new methods.
Data Representation: Preparation of bar graphs and histograms.
Class Discussion: Group reports on survey and observation data. Assessing whether any revisions are needed.

(return to main chart)

FLOW CHART E

Noise



Class Discussion: How does noise affect your classroom activities and work? Where does the noise come from? During what parts of the day is it most disturbing?

Data Collection: Class survey to determine what and when noise is disturbing.

Data Collection: Observation of classroom to determine noise source, its effects on classroom activities, when it occurs during the day, etc.

Data Collection: Measurement of noise levels during various times of day using tape recorder or noise indicator.

Data Collection: Survey of other classes, buildings to determine methods of sound insulation.

Data Representation: Preparation of bar graphs, line graphs, and histograms.

Class Discussion: Reports of groups. Discussion of ways to control noise in the room.

Physically changing the room, e.g., rugs, partitions, study carrels, etc.

Publicity to remind class to be quiet.

Class Discussion: Discussion of ways to evaluate changes.

Data Collection: Observation of class to determine suitability of new methods.

Data Collection: Measurement of noise using tape recorder or noise level indicator.

Data Collection: Class survey to determine suitability of new methods.

Data Representation: Preparation of bar and line graphs.

Class Discussion: Group reports on survey and observation data. Assessing whether any revisions are needed.

(return to main chart)

5. A COMPOSITE LOG*

This hypothetical account of an intermediate-level class describes many of the activities and discussions mentioned in the Flow Charts. The composite log shows only one of the many progressions of events that might develop as a class investigates a Classroom Management challenge. Documented events from actual classes are italicized and set apart from the text.

One day after several weeks of school the children begin to talk about many annoying incidents which have occurred in the room since school began. "I never get to take the lunch count." "We never have enough time to get our books and papers together before we change classes." "I can never find my homework papers." At this point the teacher asks the children if they would like to try to find ways to solve some of the problems. After the children indicate that they are interested, the teacher writes on the board the challenge, "How can we make the class run more smoothly?"

> *After several discussions the children in one first/second-grade class in Lansing, Michigan, identified two main problems that caused disruptions in the class routine: the hall/bathroom monitor selection process and the organization of personal papers. The children were very annoyed with the teacher because she kept choosing the same children to be monitors. In addition, the second graders expressed an annoyance with the first graders because the latter were always losing their written instructions and interrupting the teacher while she was working with the second graders. (See log by Carol Hamilton.)*

> *The desire to maintain a neat classroom arose after this sixth-grade class in Lexington, Massachusetts, had spent several weeks making physical changes to the room in response to the Classroom Design challenge. The children felt that the classroom jobs were necessary and devised an incentive system to insure that the jobs were done. (See mini-log by Robert Farias.)*

The children quickly offer many solutions to the problems mentioned earlier. "Go down the class list so that everyone can do the lunch count." "Stop math sooner so that we can get our spelling notebooks and papers out." "Have folders to store our papers in." However, they soon realize that there are probably other problems which they have forgotten. Several children wonder whether observing the existing classroom procedures would be helpful in spotting other classroom problems. The class agrees and votes for a one-week observation period.

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*Written by USMES staff

In order to observe systematically the classroom routine, the children classify the various classroom activities into five categories: jobs, scheduling, rules, distribution and storage of papers, and noise. The children then divide into five groups, one to observe each category.

During the week, the groups record what takes place in the room. The Job Group notes that everyone volunteers to do the lunch count, but no one wants to clean the coat closet. They also confirm the complaint that the teacher seems to pick the same children to pass papers and to take attendance. The Scheduling Group records that on four out of the five days the class took a long time to settle down after lunch to begin free reading. The Noise Group notes that the hall noise is extremely distracting before and after lunch.

After the one-week period is over, the groups come together to share their observations. The children decide to list on the board all the problems that each group has observed. The final list appears as follows:

Scheduling problems

1. Not enough time to prepare for next class.
2. Not enough time to complete math assignment.
3. Cannot "silent" read after lunch period.
4. Small groups working on projects need to meet more than twice a week.

Keeping the classroom neat - classroom jobs

1. Everyone wants to take the lunch count.
2. Same people get to take lunch count and pass out papers.
3. Coat closet is a mess.
4. Books cannot be found in classroom library.

Rules

1. People talk all the time.
2. Gum chewing during class.
3. Swearing.

Distracting noises

1. Cannot work--people talking during class.
2. Hallway noise, especially before and after lunch.

Paper distribution and storage

1. No place on teacher's desk to put finished work.
2. Cannot find written assignments or returned papers.

The children agree that some problems are more urgent than others. They decide to work on the urgent problems first and then, if time allows, work on the others. A hand vote is taken; classroom jobs and the storage and distribution of papers are voted as being most urgent. Two major groups are formed, and each goes off to a corner of the room to sketch out a plan.

The Job Group begins by identifying questions relevant to classroom jobs. A list of questions is made.

1. What jobs need to be done in the classroom?
2. How long should a person hold a job?
3. How should the jobs be assigned?
4. How should a job be judged and who should judge whether it was well done or not?

The children agree that they first need to assess what the present classroom jobs are, including job duties, and find out what other jobs the class could do for the teacher. Part of the group prepares an observation sheet to be used in collecting data on the present jobs. The other group members go off to arrange a time with the teacher to talk about new jobs the children can do.

The observation sheet is made and appears as follows:

Job:

Observation:
1. What does person do?
2. How long does it take person to do job?
3. How often does job need to be done?
4. Does job seem difficult?

The form is put on a ditto and about fifteen copies are made. The children decide to observe the workers for one week. They identify eight jobs which are presently done in the classroom:

TIME IT TAKES TO DO JOB DURING ONE WEEK	MON.	TUES.	WED.	THURS.	FRI.
Board Keeper	5:28	6:00	4:55	5:40	4:40
Supplies distributor	2:10	1:40	1:40 1:20	1:20 1:45	1:50
Window Keeper	0:20 0:10	0:20 0:25 0:15	0:10 0:25 0:15	0:18 0:20	0:11 0:18
Reading corner cleaner	—	2:05	—	—	2:10
Coat closet cleaner	3:10	—	3:00	—	4:00
Lunch counter	0:18	0:21	0:19	0:18	0:25
Attendance taker	0:20	0:20	0:30	0:35	0:18
Paper drawer cleaner	—	1:50	—	—	2:30

Key: times are in minutes and seconds.
1:40 = 1 minute, 40 seconds.

Figure B5-1

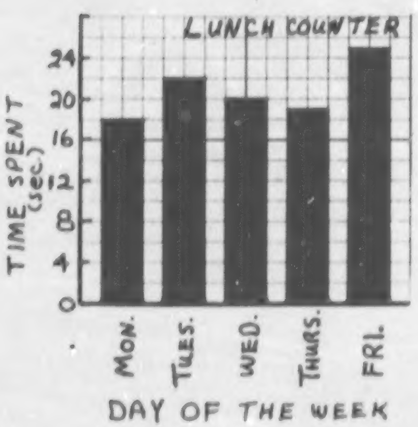


Figure B5-2

1. boardkeeper
2. supplies distributor
3. window keeper
4. reading corner cleaner
5. coat closet cleaner
6. paper drawer cleaner
7. lunch counter
8. attendance taker

Each child takes one job to observe. Stopwatches are obtained from the Design Lab.

After one week the observers convene with all their data. They quickly decide to combine all the observation data onto one chart. (See Figure B5-1.)

However, as they begin to draw up a chart form, they realize that it would be too confusing to read. They consult the teacher who, in turn, suggests that they may find the "How To" Cards on graphing helpful. After looking through the cards, the children decide to make a bar graph for each job showing how long it took each day to do the job and one bar graph to compare how often each job is done during the week. For the jobs of window keeper and supplies distributor the children first add the different timings to obtain a total timing for the day. The graphs are shown in Figures B5-2 and B5-3.

The children show their graphs to the class the next day. Several class members comment that it is hard to compare the job timings because the information is on eight different graphs. Someone suggests combining the information onto one graph and recalls seeing a set of "How To" Cards on how to do this. The group agrees to graph the information on one graph. They spend the rest of the day reading the "How To" Card set, "How to Show Several Sets of Data on One Graph." Their final graph appears in Figure B5-4.

The following day the class discusses approximately how long each job holder took to do his job. One child suggests that they find the average time taken for each job. Several children who know how to calculate averages help those who do not. The averages reported by each group are shown on the following page.

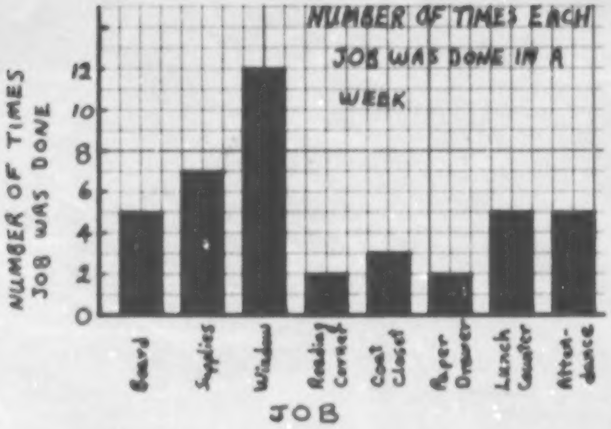


Figure B5-3

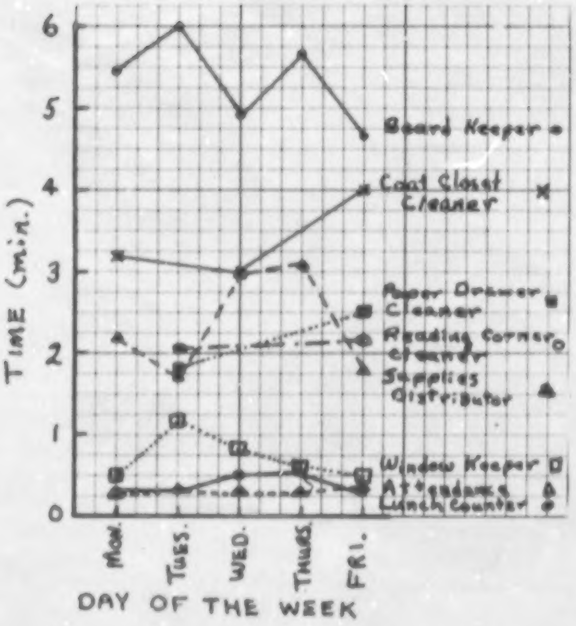


Figure B5-4

Job	Average time to do job
Boardkeeper	5 min. 20 sec.
Supplies distributor	1 min. 45 sec.
Window keeper	18 sec.
Reading corner cleaner	2 min. 07 sec.
Coat closet cleaner	3 min. 23 sec.
Lunch counter	20 sec.
Attendance taker	25 sec.
Paper drawer cleaner	2 min. 10 sec.

Several children decide to make bar graphs showing these average timings.

The Paper Circulation Group decides to survey the class to determine how many children have a paper storage problem. A simple survey is designed and distributed. Their survey appears as follows:

Survey on Paper Storage	Circle Your Answer	
1. Can you always find your homework or written assignment papers?	yes	no
2. Do you have one place where you put your homework papers?	yes	no
3. Where do you put your returned papers?	______________	
4. Do you like the way corrected papers are returned? Why?	______________	

As the group waits for the surveys to be returned, several children interview the teacher to determine her opinion on the present method of handing in papers. The group learns that the teacher is very dissatisfied with the present procedure because many papers become misplaced on her desk, and she has to spend a lot of time looking for them.

In a few days all the surveys are returned to the Paper Circulation Group. The children tally the responses and obtain the following results:

Survey on Paper Storage	Circle Your Answer	
1. Can you always find your homework or written assignment papers?	yes = 3	no = 24

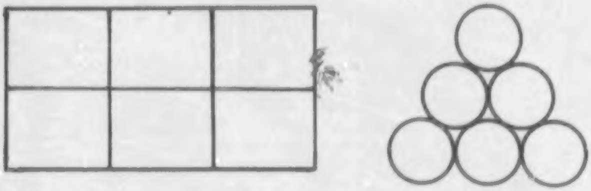
2. Do you have one place where you put your homework papers? yes = 2 no = 25
3. Where do you put your returned papers? book = 9 desk = 11 notebook = 5 throw out = 2
4. Do you like the way corrected papers are returned? Why? No. Papers always fall to the floor.

Based on the survey and teacher-interview data, the group agrees that both the teacher and the class need containers to hold their papers. The children spend some time drawing designs for the teacher's paper holder after first discussing with her what her needs are. The teacher requests two features:

1. Six compartments--for math, spelling, social studies, science papers, reading workbooks and book reports.
2. The papers must be easy to take out.

The children agree on two designs to submit for a class vote. The two designs are shown in Figure B5-5.

Figure B5-5



For individual storage boxes, the children agree that a shoe box or a stationery box would be sufficient.

The Paper Circulation Group reports the results of their survey and teacher interview in the next class discussion. The two paper holder designs are shown. The children explain why six compartments are needed and that the holder would be placed on the spare desk and put near the teacher's desk. Several children wonder where the group would be able to get cylinders and how they would attach the cylinders together. Most of the children feel the rectangular holder would be easier to make. The class votes and the rectangular holder wins, nineteen to eight.

Next, the Paper Group asks the class whether they feel a small box such as a shoe box on top of each child's desk would help the children organize their papers. The class agrees and is willing to try out the boxes. The class votes to allow the paper group to be responsible for obtaining twenty-seven shoe boxes. They decide that each child should decorate his/her own box.

The Job Group reports the results of their observations and teacher interview. The children who had talked with the teacher report that, in addition to the present jobs that were identified by the children, the teacher identified four additional jobs with which the children could help:

librarian--keep books in order, return books to library
art assistant--aid the art teachers, clean up
floor cleaner--sweep floors, pick up papers, books
news director--maintain bulletin boards

The job observers show and explain their graphs of the job data that they have collected. They report that all eight job holders felt that their jobs were fairly easy to do. The class then wonders what the popular jobs are and how popular each job is in relation to the others. The job group agrees to conduct a survey to determine job desirability.

Before the class disbands, many children bring up the problem of not having enough time to work in their small groups. The class decides that a scheduling group should be formed as soon as possible to study the problem.

After two months of small group work, children in a third/fourth/fifth-grade class in Lansing, Michigan, began to voice complaints about the lack of time during the week for their groups to meet. The problem was further complicated by the fact that many children belonged to several groups. A scheduling group was immediately formed to tackle the problem. (See log by Carol Allen.)

In the ensuing weeks most of the Paper Group members work in the Design Lab, drawing plans and constructing the teacher's paper holder. The children agree that one compartment must be larger than the rest because the reading workbooks are bulky. They also agree that the papers and workbooks would be easier to remove if they stuck out slightly from the compartments in front and some leeway was left on the sides to slide the papers in and out. One child manages to collect fourteen workbooks. The group measures the amount of space that they occupy. They find that the fourteen workbooks stacked together are 3½ in. high, 9 in. wide, and 11 in. long. They decide that if the compartment is 10 in. high, 7 in. wide, and 10 in. long all the workbooks would fit standing on their sides.

A fourth-grade class in Washington, D.C., designed and built a compartment to store some of the tote trays that were kept on the floor. Those children who did not have regular desks kept their books and papers in these trays. The children weighed full trays in order to determine whether to use Tri-Wall or lumber. They measured the height of the tallest books to determine the height between shelves. They also determined the number of trays to be stored in the compartment and measured to find the total length of the compartment. (From log by Sandra Baden.)

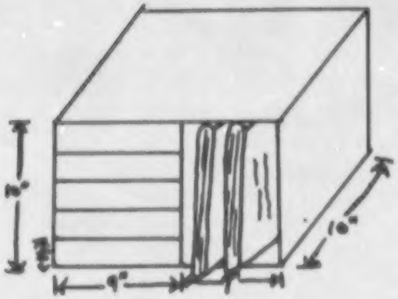


Figure B5-6

To obtain the dimensions of the other compartments, the children use a pile of papers as a sample to measure a suitable amount of space. The group agrees on the dimensions shown in Figure B5-6. In order to make sure their measurements are suitable, the children make a scale model using two-ply cardboard before constructing the final holder from Tri-Wall. The finished holder is placed on a spare desk and moved near the teacher's desk.

Children in a third/fourth-grade class in Washington, D.C., found a more efficient way to turn in their assigned work. Rather than waiting for the teacher to take the paper or putting it in the subject folder tucked between other folders on the desk, the children designed and constructed a mailbox. The mail-

> *box was a large box divided into separate compartments for each subject area. Each compartment had its own slot. The mailbox was placed beside the teacher's desk where she could easily reach in from the back to remove the papers. The children really enjoyed "mailing" their papers. (From log by Marva Falls.)*

The children who are not working on the teacher's paper holder scrounge for shoe boxes. After several days of asking the other children in the class to bring boxes, the group decides to solicit the help of other classes. They write a memo to five other teachers asking them to make the following announcement in their room:

> The children of Mrs. B's class need shoe boxes to help organize their homework papers. Could you please help us by bringing in shoe boxes?
>
> Thank you.

Several days later the children have thirty-eight shoe boxes. Each child in the room receives a box to decorate. After one week all the classroom desks have decorated shoe boxes on them.

Before drawing up the survey for determining children's preferences for jobs, the Job Group examines the tasks for each job. The children agree that a short description of the responsibilities for each job should be included in the survey. The children spend several days writing up job descriptions. Some of the jobs are combined with others, such as the lunch counter with the attendance taker, the supplies distributor with the paper drawer cleaner, and the news director with the art assistant. The window-keeper's job is eliminated because the group feels that anyone should be able to open or close the windows. Their job descriptions appear as follows:

Librarian--Keep track of books on loan from the school library. Return books on time. Bring new books back to room. Keep classroom library in order.

Art Assistant--Help the art teacher, including passing out supplies and cleaning up. Maintain the classroom bulletin boards.

Floor Cleaner--Sweep floors. Pick up papers, books, etc.

Table Cleaner--Straighten out things (projects, games, etc.) on table.

Boardkeeper—Wash blackboards at the end of each day. Clap erasers outside. Average time to do daily, 5 min. 20 sec.

Supplies Distributor--Pass out papers, Weekly Readers, etc. Keep paper drawer neat. Average time to do seven times a week, 3 min. 55 sec.

Reading Corner Cleaner--Keep the reading corner neat, e.g., straighten out reference books. Average time to do two times a week, 2 min. 7 sec.

Coat Closet Cleaner--Straighten out coat closet. Average time to do three times a week, 3 min. 23 sec.

Lunch Counter/Attendance Taker--Take hot and cold lunch count. Take attendance. Average time for lunch count five times a week, 20 sec. Average time for attendance five times a week, 25 sec.

During a class discussion of the job descriptions, one student remarks that they do not know how long the first four jobs will take and how often they need to be done. The teacher asks who will be willing to do the jobs for a week and keep track of time spent and how often the jobs need to be done; four children volunteer.

The survey is distributed after the job descriptions are written. Each child is asked to list the nine jobs in order of personal desirability, the most desirable job being number one and the least desirable job number nine.

When the surveys are returned, the class breaks up into groups to tally the individual ratings. The next day the jobs are listed on a chart on the board and nine columns are made beside each job for the various ratings. Each group then reads the ratings they have tallied until the chart is complete. The total number for each rating for each position is shown on the next page.

The class looks at the finished chart and expresses disappointment because they still cannot list the jobs in order of overall preference. The teacher then explains that a total score for each job can be obtained and shows how it can be done. The class proceeds to do the work. They weigh each rating by assigning points, the most desirable job receiving one point, the second most desirable job two points, etc. By multiplying the points by the number of votes for each rating and adding the totals for each rating, the children obtain a total score for each job.

	most desirable						least desirable		
	1	2	3	4	5	6	7	8	9
Librarian	1	2	3	1	4	0	3	2	11
Art assistant	2	1	3	1	2	3	3	3	10
Floor sweeper	4	2	1	4	3	2	2	4	5
Table cleaner	0	2	6	2	2	9	3	3	0
Boardkeeper	2	10	3	3	5	4	0	0	0
Supplies Distributor	3	2	0	8	4	2	5	3	0
Reading corner cleaner	0	2	4	9	3	3	4	2	0
Coat closet cleaner	2	5	1	4	1	3	4	5	5
Lunch/attendance	11	3	5	1	5	1	0	1	0

The children then list the jobs in order. The jobs with the lowest scores are put first since a low score indicates that the job is a desirable one.

Job	Total points (Smaller number of points means it is more desirable.)
Lunch counter/attendance	75
Boardkeeper	92
Reading corner	129
Supplies distributor	130
Desk cleaner	139
Floor cleaner	145
Coat closet	167
Art assistant	171
Librarian	174

The sixth graders from Lexington, Massachusetts, determined the relative level of difficulty for each of the eleven classroom jobs they had identified. Each child rated each job, putting the one he/she thought most difficult to do first and the easiest last. Because the children had varying opinions of the level of difficulty for each job, the children had to weigh each rating in order to compare each job. For example, the hardest job was given eleven points, the second hardest ten points, and so forth. By multiplying the points by the number of votes for each rating, and adding the totals for each rating, the children obtained a total score for each job. (See mini-log by Robert Farias.)

In the next class meeting the Job Group reports the results of the survey. The group asks for suggestions on fair ways to distribute these jobs. A list is started on the board and includes the following ideas:

go down class list
toss dice
pull names from a hat

A quick hand vote shows that the class favors the last suggestion. The children decide that the person whose name is drawn first will pick a job; the next person will pick a job from the remaining ones, etc. Because there are only nine jobs, only nine children will have jobs each week.

The sixth graders from Lexington chose to put into the hat the names of only those children who were interested in a particular job. The name that was drawn got the job. In another year's class the children chose to put into the hat the names of all the children in the class. As a name was drawn, that person had his choice of the particular job he wanted out of the remaining jobs. (See mini-log by Robert Farias.)

After much discussion the children decide that the jobs should rotate fairly frequently so that everyone has the opportunity to share the good and bad jobs. The group votes to draw names each week and makes a rule that a person who has a job one week will not put his/her name in the hat for two weeks. After discussing these plans in a class discussion, the class also decides that one person cannot have the same job two times in a row.

> *After generating several methods of picking hallway monitors, the first/second graders in Lansing chose to make two spinners--one for boys and one for girls. Every day the monitor was picked by spinning the arrow. The child at whose name it pointed was the monitor for the day. (See log by Carol Hamilton.)*

After several weeks of trying out the paper holders and rotating the jobs, the respective groups evaluate the effectiveness of their changes. The Paper Circulation Group surveys both the class and the teacher to determine satisfaction with the paper holders. The survey is simple and the results are quickly tallied on a survey form:

Survey on Paper Holders	Circle Your Answer
1. Can you find your homework or written assignment papers?	yes = 25 no = 5
2. Do you like your paper holder?	yes = 2 no = 25
3. What improvement should be made to the holders?	bigger boxes = 23 no changes = 2 sturdier boxes = 2

Except for the problem of the shoe boxes being too small, the Paper Group is satisfied that the storage problem for papers has been remedied. During the next few days the group scrounges for larger boxes. They discover that shirt boxes, which measure 8½ inches by 15 inches, are perfect because they allow the papers to lie flat. Enough of these boxes are obtained and distributed.

During the trial period the Job Group observes that many children have forgotten to do their jobs. The group decides that a large chart would alleviate this problem because job holders could put a check in the appropriate box when they finished doing their job. They design the following chart:

Job	Days of Week				
	M	T	W	Th	F
Lunch counter/attendance					
Table cleaner					
Reading corner cleaner					
Supplies distributor					
Boardkeeper					
Floor cleaner					
Coat closet cleaner					
Art assistant					
Librarian					

The group decides that the days-of-the-week portion of the chart should be put on paper so that the paper can be changed every week. At the next class discussion the class votes to put this chart under the clock because everyone frequently looks at the time.

The children in Lexington assigned salaries (using play money) to the jobs; those jobs thought to be more difficult commanded higher salaries. With this money and a weekly base allowance (again play money), the children were able to purchase various class supplies (pencils, paper, erasers) and privileges, such as extra drinks at the water fountain. (See mini-log by Robert Farias.)

The children who had worked on the paper holders now turn their attention to other classroom problems that had been identified earlier. Eight children immediately busy themselves with the scheduling proglem. They spend the next few weeks investigating the following items:

1. What the present class schedule is.
2. What the state requirements are for instruction of each subject in the classroom.
3. The time it takes the class to do different activities.

Some of the Job Group members decide to set up a committee to check on whether jobs are being done. Other members of the group begin investigating class rules because they notice that some children seem to disregard the rules of the room. They spend several months investigating the following:

1. What the classroom rules are.
2. New rules or rules that need revisions.
3. Ways to remind children to obey the rules.
4. Fair penalties for children who disobey the rules.

A small group of children wish to work on the noise problem. They spend many weeks investigating the following:

1. The source of the noise.
2. How the noise affects the children.
3. Ways to alleviate the noise.

The Rules Group discovers that the class feels that certain rules are more important than others. Because it is difficult for others to work and enjoy school without rules, they decide to put up signs to remind everyone to obey the rules. They also suggest that when the teacher observes someone breaking a rule frequently, some privilege may be taken away for a short time.

The Noise Group surveys the class and finds out that although the room is noisiest immediately before and after lunch, the children find the noise bothersome only when they are trying to concentrate on math or reading and a part of the class is engaged in a project and talking loudly. The teacher asks for suggestions on how to remedy this situation. Several children suggest making changes in the arrangement of the room. Because most of the work on the Classroom Management challenge has been completed, the class agrees to work on the Classroom Design unit.

6. QUESTIONS TO STIMULATE FURTHER INVESTIGATION AND ANALYSIS

- What problems do you have working in the classroom?
- How can you find out whether most students think that these are problems?

- Which of these problems should we work on first?

- What are the present classroom rules and procedures?

- What kind of changes should we make?

- How many of these changes should we make at one time?

- What jobs need to be done to make the room neat and run more smoothly? What chores does the teacher do?...do students do? Which chores can the class do for the teacher? What is a fair way to distribute the chores? Which chores are hardest/easiest to do? How can we find out? How can we remind students to do their chores? What happens when students do not do their chores?

- What is wrong with the present class schedule? How much time does it take for you to do your math?...reading?... etc. How much more/less time do you need? How can you find out? How can the present schedule be changed to suit our needs? What is our present schedule? What parts of our schedule may we change? How can we find out?

- What is wrong with the present classroom rules? What are the classroom rules? Which rules need revising? What new ones do we need? Which rules are more critical for managing classroom behavior? How can we enforce the rules? What is a fair penalty for breaking different rules?

- What is wrong with the present method of storing and circulating papers and classroom materials? How can we improve this method? Which methods interfere most with the running of the classroom? How can we find out?

- How does noise affect your classroom activities and work? Where does the noise come from? What kinds of noise are most distracting to you? During what parts of the day is the noise most disturbing? How can you find out? What has been done in other classes or public buildings to lessen noise? How can you find out? How can we control the noise in this room?...outside this room?

- How can we determine whether the new procedures have helped?

- What revisions need to be made to our new procedures?

- How can we evaluate our implemented changes? Have the changes made a difference? What and how much change has actually occurred? How can we find out?

- What other problems do we have in the room that impede a smoothly running room?

- What is a good way to make a picture of your data?

- What does your data tell you?

C. Documentation

1. LOG ON CLASSROOM MANAGEMENT

by Carol Hamilton*
North School, Grades 1-2
Lansing, Michigan
(September 1974-May 1975)

ABSTRACT

After a long discussion, this first/second-grade class agreed that the room was not as smooth-running as they had thought at first. They identified two main problems, the selection of the hall monitors and the organization of papers on their desks. Working on the challenge for approximately one-and-a-half hours per week, the class agreed that using spinners would be the fairest way to select the monitors. They designed and constructed two spinners, one for boys and one for girls. They tested each spinner by spinning the arrow many times and tallying the number of times the arrow pointed to each name. To solve the problem of misplaced papers the children designed and constructed individual mailboxes, making all the boxes the same size, which they determined by measuring the largest piece of paper that they used daily. The class also worked on the problems of hallway noise and classroom jobs. Posters and signs were made and hung in the corridors to remind children to be quiet. Possible classroom jobs were listed on the board; descriptions and special requirements were written for the jobs. The children then wrote applications for the job they wished to hold. In cases where two or more children applied for the same job, tests of performance were devised. In the end, every child had a job.

After they had been in the room for several weeks, I asked the children whether everyone liked being in this class, and if not, why. Most of the children said that they really liked being in the room with me; several brave children expressed a slight preference for another teacher's class. I then asked the class what they thought classroom management meant. At first the children felt that management of the class was stricly the teacher's role. However, as the list of "definitions" grew, the children began to see that each child in the room had some responsibility for keeping the room orderly. Some of their definitions of classroom management are listed below:

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*Edited by USMES staff

How the teacher makes you behave.
What the teacher does to teach you.
What time you have recess, reading, and math.
Finding out what to learn.
Doing chores in the room. Who will do them.
Deciding what work to do first.

One girl summarized our discussion of classroom management in this way:

> "Classroom management is what you do so everyone can do what they are supposed to do, so the day can go good, and we can learn things good."

During the following session we continued our discussion of classroom management. We decided to examine closely our daily routine to make sure everything was indeed running smoothly. After a very short time, the children began pointing out things that distracted them from their work during various times of the day. Some of their complaints are listed below.

It's noisy sometimes.
Some people forget and chew gum.
People misbehave in halls.
The hall noise comes in our room.
People use activity center when their work isn't done.
People try to be first all the time.
People talk, not whisper.
Same people get to be monitor.

I then asked the children how we could make our daily routine run smoother. Since some children still felt that things were fine as they were, we decided to have a hand vote to see how many did and did not want to change. The result was that seventeen wanted to work on classroom problems, while six felt that everything was all right. However, this vote didn't seem to mean anything to the children because they could not see the difference between the votes for each opinion. I therefore wrote the names of the seventeen children who wanted change on one side of the board and then recorded on the other side the names of those six who were satisfied with the room. Looking at the two lists, the children clearly saw that one column was much longer than the other.

Being convinced that most children wanted some change, we went over their list of things that could be improved in the room. Suggestions for correcting each problem were recorded on the board next to that problem. Part of the list is shown below.

To control noise in room--make people put heads down.
Gum chewing--go to principal's office or write many times, "I will not chew gum."
Completing class work--if work is not completed, one does not go outside for recess.
To control noise in hall--close classroom door, put signs up.
Misuse of centers--lose privilege to use.
Losing papers--mailbox or some container to pile papers.
Choosing monitors--draw names, make a list.

The class noted that most of the solutions they had suggested were already being implemented and were not effective. We discussed which problems bothered them the most, and two stood out--the selection of the monitors (bathroom-hall) and the organization of papers on their desks.

The children decided to tackle the monitor problem first because most children were annoyed that the same boy and girl were being picked (by me) to be the monitors. It was quite obvious that my procedure for selecting monitors was very unfair. We talked about ways that the monitors could be selected. The children came up with many good ideas which are given below.

1. Draw names from boxes (boys' and girls' boxes)
2. Choose people alphabetically, go down the rows (seating arrangement)
3. Continue to have me choose
4. I choose one and then that person chooses his replacement
5. Put names on a spinner
6. Keep the monitors forever.

We discussed the pros and cons of each suggestion. For example, the children voted down the suggestion to draw names because the question arose as to what to do with names already drawn. Several children felt that if those names were returned to the boxes, then the names might be drawn again and some people might never be picked. The children saw problems with the method of choosing people alphabetically in that they wondered what would happen if people were ab-

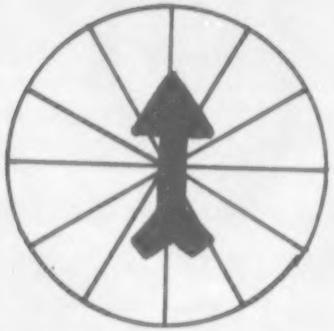

Figure C1-1

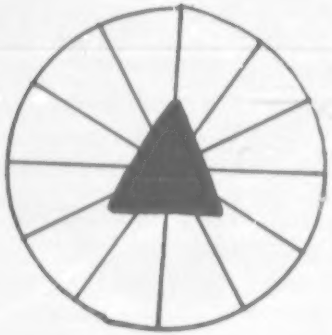

Figure C1-2

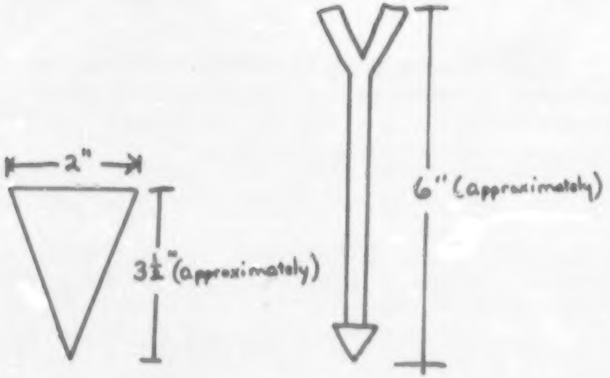

Figure C1-3

sent; i.e., would they then miss their turn? As we discussed each alternative, it became increasingly evident that the class was partial to using spinners because they involved construction. They finally agreed to make two spinners, one for the girls and one for the boys.

Various individuals first drew their spinner designs on the board for the rest of the class to discuss. The girls selected the spinner design shown in Figure C1-1. The boys chose the design shown in Figure C1-2. The groups then met and drew up their plans.

When we discussed the spinner plans, it was evident that alterations were needed. The children had difficulty drawing circles and dividing the circles into twelve equal sectors (twelve girls, twelve boys). It was also quickly noted that unequal sectors would not be fair because the smaller ones would not have an equal chance of being chosen. The children redrew their plans.

Because circle sizes had not been specified on the children's plans, I asked the children how big they should be. Everyone agreed that the circles should be "this big," holding their hands out. We went to the Design Lab where I showed the children the circle cutter. After I demonstrated the various circle sizes the cutter was capable of making, the children chose the largest circle, which was approximately twenty-four inches in diameter. Because the children were not strong enough to use the cutter, I cut out the two circles. I then divided each circle into twelve equal sections.*

The following day the children painted the circles. They decided to make each sector a different color so that a person could see his/her sector from across the room.

In order to select the person to write the names of the children on the respective spinner, a contest was held to determine who had the best handwriting. Each contestant wrote the sentence, "U.S.M.E.S. helps to make work fun." Entries were voted on by the class; naturally, the winners were quite pleased.

Pointers for the spinners were cut from cardboard and painted. Again the children were satisfied just to draw the pointers without regard to measurements. The children worked very cooperatively, making sure everyone had an opportunity to help. Designs for the final pointers are shown in Figure C1-3.

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*The children might try several ways to divide a circle into twelve equal sections; paper circles could be used for these trials.—ED.

With the two components completed, the children pushed brass tacks through the pointers to attach them to the circle backings. The two circles were then hung using masking tape, on my closet door. The children spent several minutes taking turns spinning both the arrow and the triangle. After a while, three boys, whose names were in top sectors of the circle, noted that the triangle always seemed to point to names at the bottom of the circle.* They were naturally a bit upset and again raised the question of whether the boys' spinner was fair.

We talked about how we could test to see which spinner was the fairer. The children suggested that we spin both the arrow and the triangle many times.** I asked how we could possibly remember the number of times each name arose. The children suggested that we write down each name as it came up. One child suggested we write down everyone's name and put a mark by the name as it arose. Everyone liked this last idea, and so two forms were made, one for the girls and the other for the boys. These forms were hung next to the respective spinners. The children took turns spinning the arrow and the triangle and marking an X by the name. After a while I wrote six questions on the board for the groups to think about and answer:

1. How many spins?
2. Who had the most?
3. Who had the least?
4. Is there a lucky number? (lucky space)
5. Is there an unlucky number? (unlucky space)
6. Is (the spinner) it fair?

Of the two spinners, the class decided that the girls' was the fairer. The results of the two groups are shown on the following page.

---

*The children might check the placement of the tack in the spinner; the teacher might ask if "merry-go-rounds" on playgrounds always stayed the same distance from the ground as they went around.--ED.

**The children could also construct a twelve-sided solid shape (a dodecahedron) and check to see whether the shape was more fair than the spinner. Older children might toss the shape or spin the spinner in sets of fifteen or twenty tosses or spins and check the distribution of results for one certain name in the various sets.--ED.

	Girls	Boys
No. spins	34	35
Name that had most	8 - Sandy	11 - Brian
Name that had least	0 - Kim	0 - Trevor, Kenny, Bob
Lucky no.	yes - Sandy	yes - Craig, Mark
Unlucky no.	yes	yes
Spinner fair?	yes - no (no agreement)	yes - no (no agreement)

Even though the girls were not in total agreement that their spinner was 100% fair, they were satisfied enough not to want to make alterations. The boys, however, decided to correct the triangle, which had continually pointed to the sections at the bottom of the circle.

By the time the boys got around to re-examine their spinner, the spinner had changed. After several days of hanging, the room heat made the tape on the back of the circle come loose, causing the bottom part of the circle to curl up slightly. This curled edge seemed to compensate for the displaced triangle because, after several spins, the boys decided that their spinner was now fair.

After the monitor problem was solved to their satisfaction, the children next focused their attention on the paper problem. We reviewed the reason that they had for identifying this as a problem and recalled that we had agreed to construct mailboxes as a way to solve the problem.

We talked extensively about how big to make the individual mailboxes. The children reasoned that if the boxes were going to hold their school papers, they needed to be slightly larger than the largest paper they used daily. No one knew how big the paper was. Several children used their hands to designate size. It was soon obvious that some sort of standard measurer was needed. A meter stick was obtained and I held a skills session on how to measure.

The children measured the paper to determine two dimensions of the box. The paper was 23 cm. by 30.5 cm. To allow for easy storage and removal from the box, the children decided to store the paper on its end and to add approximately 25 cm. to the length of the box, making it 23 cm. tall and 33 cm. long.

The children soon realized that there were more than two sides to a box. They determined that they needed two little sides (ends) and a bottom to complete the box. See Figure C1-4. Someone suggested putting on a top, but this idea

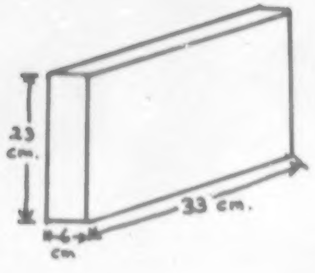


Figure C1-4

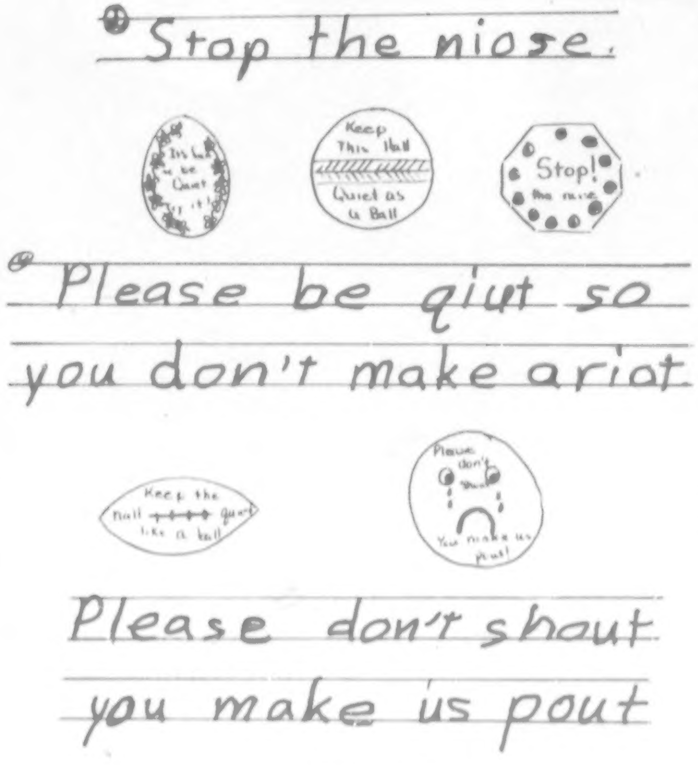

Stop the niose.
Keep This Hall Quiet as a Ball
Stop! the noise
Please be qiut so you don't make ariot
Keep the hall quiet like a ball
Please don't shout You make us pout
Please don't shout you make us pout

Figure C1-5

was vetoed by the class. In the end the class agreed they needed the following number of pieces to make one mailbox:

Two "big" sides, each 33 cm by 23 cm
Two "small" sides, each 6 cm by 23 cm
One bottom, 6 cm by 33 cm.

The children reasoned that if all the boxes were going to be the same size, they could mass-produce the sides, thereby making the construction process easier for the first graders. They agreed to make the boxes out of tag board.

In the following sessions the children measured and marked the tag board while I cut the pieces. Many of the second graders assisted the first graders with the measuring. After a while, however, most of the first graders lost interest in the measuring and marking. Therefore, while the second graders continued this activity, I directed the first graders' attention to the hallway noise problem since the children had recently complained about this noise.

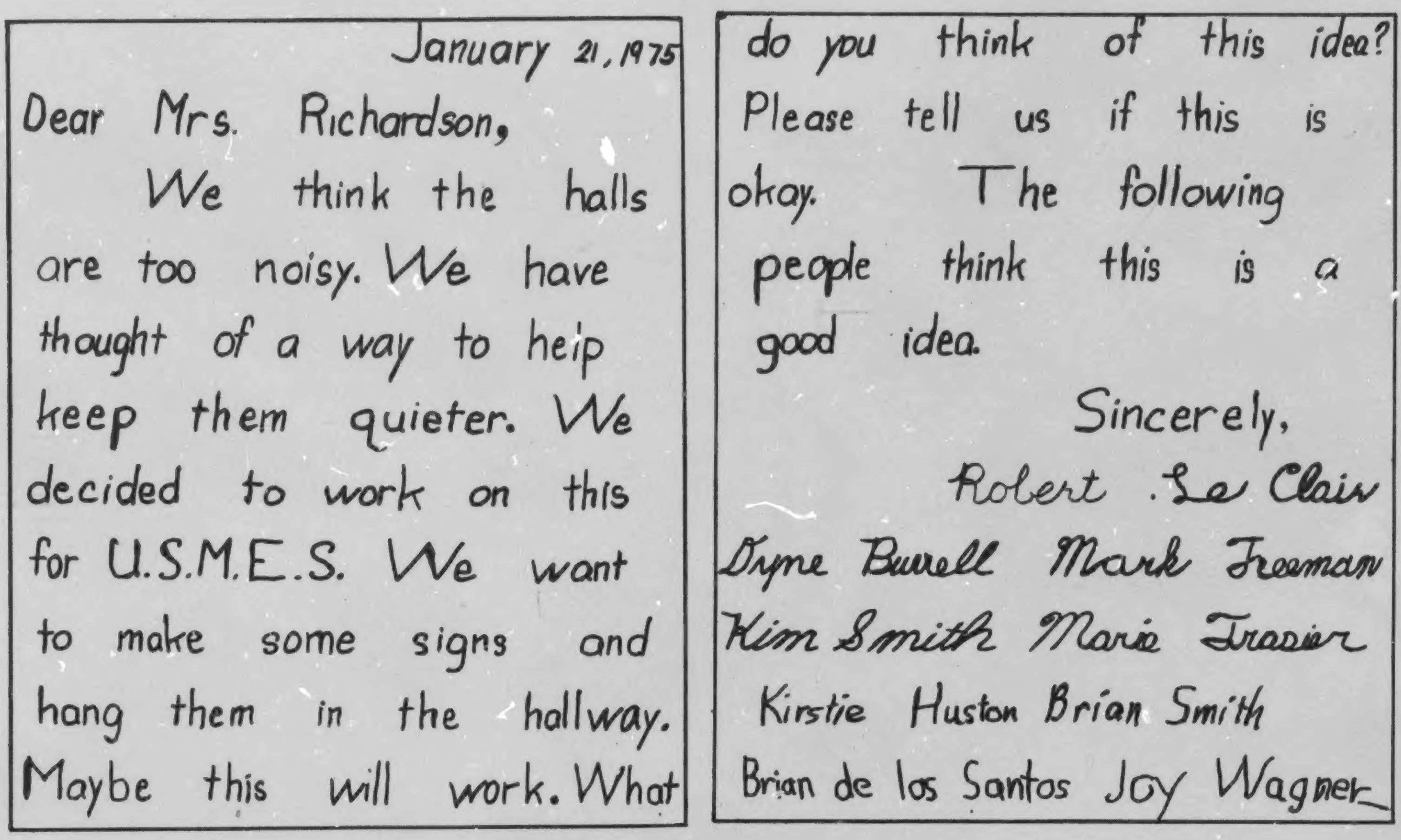
Because our classroom is opposite the rest rooms and drinking fountains, the class is frequently disturbed by the noise made by the seven classes that use these facilities. We talked about this problem and decided that we had two alternatives:

1. Make signs and posters asking the children to be quiet.
2. Close our classroom door.

We agreed that the second solution was fairly effective in reducing the noise; however, we also agreed that the closed door cut off our fresh air. The children therefore decided to make posters and signs.

The first graders spent several days planning and drawing their "quiet" posters. (Examples of their slogans and copies of the posters are shown in Figure C1-5.) When several were completed, the group composed a letter to send to the principal requesting permission to hang the posters in the hall. Several children copied the letter. The letters that were done in the neatest penmanship were delivered to the principal. Figure C1-6 shows one child's letter.

When all the sides were cut, the mailboxes were assembled. The children quickly vetoed the use of glue (I did not think of using the hot glue) and agreed that masking tape would suffice. In taping the boxes, the children discovered that it was much easier if one child held the pieces together



January 21, 1975

Dear Mrs. Richardson,

We think the halls are too noisy. We have thought of a way to help keep them quieter. We decided to work on this for U.S.M.E.S. We want to make some signs and hang them in the hallway. Maybe this will work. What do you think of this idea? Please tell us if this is okay. The following people think this is a good idea.

Sincerely,

Robert Le Clair

Dyne Burell Mark Freeman

Kim Smith Marie Frasier

Kirstie Huston Brian Smith

Brian de los Santos Joy Wagner

Figure C1-6

while a partner taped. The spirit of cooperation was evident, and all the boxes were completed in a few days.

The entire class was involved in painting the boxes. Each child decorated his box to his liking. Tempera paint was used. The children did not seem to mind that some boxes warped due to the paint or that thick coats of paint peeled. They were extremely proud of their boxes, which were taped to the sides of their desks.

The mailboxes were immediately put to use, holding the children's incomplete papers. Most of the children felt that the boxes helped them to be more organized. A few days later I noticed that several children began using the mailboxes to hold books, crayons, and toys. These boxes soon began to fall apart. Some children repaired their boxes; others did not seem to notice or care.

By April many of the mailboxes had fallen apart. A few of the ones that had been better taped and used more carefully were still in good condition. The children realized that they should have used stronger materials or should have been more careful in their use. To date, they have not suggested making new boxes.

We discussed the effectiveness of the quiet posters after they had been up for about two weeks. The children noted that the first week they were up there seemed to be more noise because the children were talking about the posters. However, once the smaller children knew what the posters said, the class felt there was a slight improvement. This slight improvement did not last long, but the children were not discouraged. The principal was extremely enthusiastic about the posters and asked the children to make more for the other corridors.

The class became involved in classroom jobs after I received a faculty bulletin discussing some of the poor housekeeping habits that many of us teachers have! I mentioned this bulletin to the children and they expressed a need to clean our room. They identified the following problems:

1. Bookshelf needs straightening.
2. Papers all over the floor.
3. Dusty windows.
4. Erasers need cleaning.
5. Chalkboards are dirty.
6. Game pieces on the floor.
7. Pencils on the floor.
8. Desks are dirty inside and top.
9. Piano is dirty.
10. Desk rows are crooked.

The class made a list of all the possible classroom jobs that were either being done or should be done in the room:

1. board eraser
2. dusting
3. book shelves
4. board washing
5. Lite Brite (a game with pieces)
6. math bulletin board
7. passing out folders
8. cleaning the trays under the boards
9. paper passer
10. floor monitor
11. erasers
12. counter
13. interest centers
14. paints
15. paper box
16. paint brushes
17. water carriers (for painting)
18. wash desk tops (once a week)
19. junk person
20. chair arranger (keeping them pushed in)
21. record players
22. shades
23. messenger.

The children were very excited about the jobs and began volunteering for various jobs. I pointed out that most children wanted the same jobs and that I felt that I could not choose a child because I did not know who would be best for the job. We discussed how reasons such as "I want the job" or "I like the job" were not enough to insure that the best qualified worker got the job. The children agreed and decided that more information on each job was required before it could be assigned to someone. The class made the following list of needed job information:

1. Name of job
2. What to do on job
3. How often job needs to be done
4. When job needs to be done
5. Anything extra.

The class spent several weeks writing job descriptions. They divided into five groups, each group writing approximately four job descriptions. When these were completed, they were shared with the rest of the class. Revisions, deletions, and/or additions were made. The class's final list of descriptions appears as follows:

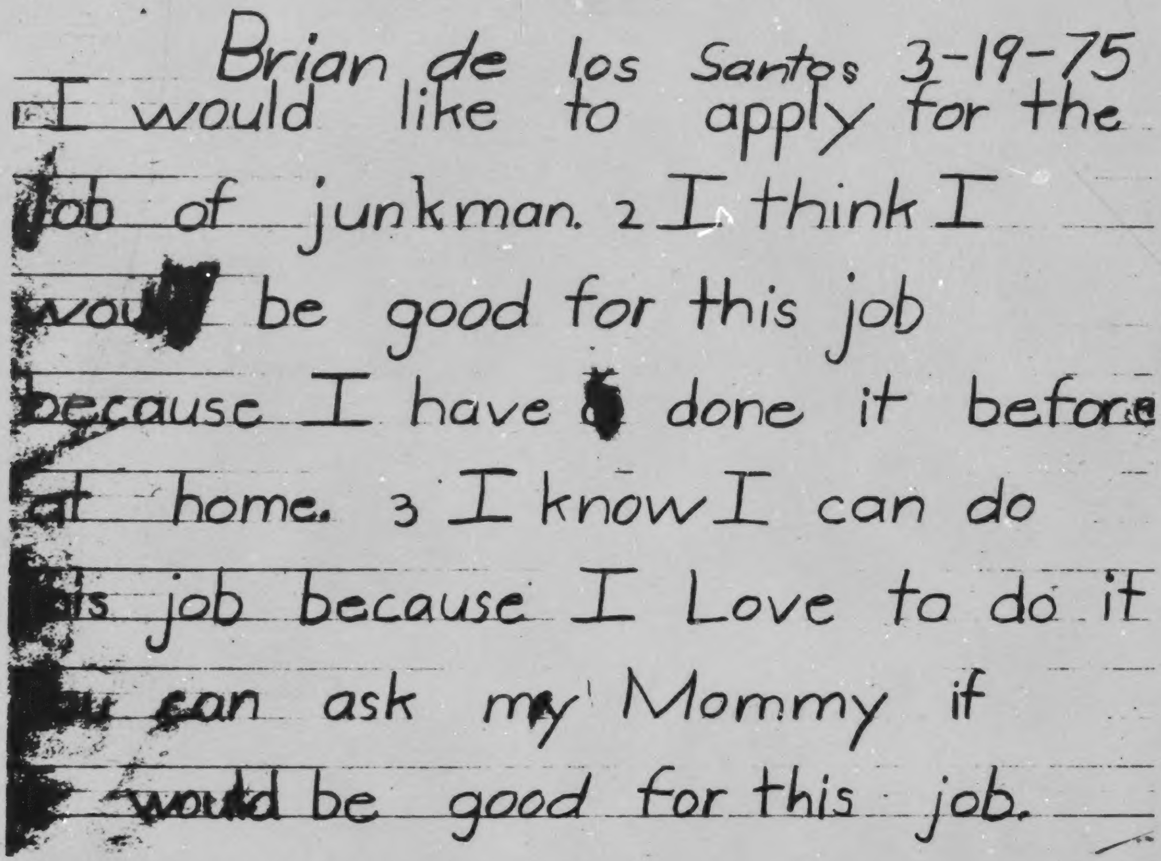
Board eraser--erase the boards every day at 3:30 p.m.
Dusting--dust everything on Monday and Wednesday during free time.
Book shelves-- straighten book shelves on Monday and Wednesday during free time.
Board washing--wash boards each day at 3:33 p.m.
Lite Brite--put away the Lite Brite pieces each day at 3:30 p.m.
Math bulletin board--take papers off math board each day during free time.
Folder passer--pass out folders each morning before 9:00 a.m.
Floor monitor--pick up scraps after art class and everyday at 3:30 p.m.
Paper passer--pass out paper to students whenever the teacher says to.
Erasers--clean the erasers Monday and Wednesday at 3:30 p.m.
Trays--Wash the blackboard trays on Monday and Wednesday at 3:33 p.m.
Counter--straighten the paper counter each day at 3:30 p.m.
Interest centers--straighten centers each day during free time.
Paints--clean up paints after each use.
Paint brushes--wash brushes and put them away after each use.
Paper box--keep the "extra work" box neat, done during free time.
Water carrier--get the water each day at 3:30 p.m.for plants, and when class paints.
Wash desk tops--wash desk tops when teacher says they need it.
Junk person--take trash can around room when needed.
Chair arranger--straighten chairs at the reading table each day at 3:30 p.m. and whenever necessary.
Record player--take care of the record player when used.
Shades--pull the shades down and up when told.
Messenger--go to office with messages when necessary.

We reviewed all the job descriptions to note any special job requirements. The children pointed out that those who rode the bus would not be able to stay late to do the boards. They also noted the following problems and restrictions:

1. short people would find it hard to wash the top of the board,
2. all class work had to be completed before someone could do his job, and
3. some children would not know where the cleaning utensils were, such as rags, buckets, eraser cleaner, etc.

Someone suggested that they write job requirements similar to the ones found in the "Help Wanted" section of the newspaper. The children agreed and spent a few days making a list of "special" job requirements. Their final list appears as follows:

1. Erase boards--tall second or first grader.
2. Wash boards--tall second grader; a walker (non-bus rider.)
3. Water carriers--dependable, strong, second grader.
4. Clean erasers--dependable, knows how and where.
5. Dust--work with hands, no allergies.
6. Shelves--neat, done during free time.
7. Bulletin boards--tall second grader.
8. Folders--able to read, able to pass quietly.
9. Floor-good eyes, likes to be on floor.
10. Counter--neat piler.
11. Centers--neat, done during free time.
12. Trays--quiet, likes water.
13. Paper box--likes to straighten.
14. Brushes--dependable, quiet.
15. Wash desks--fast, good chooser (choose helpers), done during free time.
16. Chairs--straighten quietly.
17. Record player--second grader, knows how to be careful and use it.
18. Shades--knows how, careful, sits near them.
19. Office messenger--dependable, gets work done.
20. Paints--done during free time, strong, good straightener.
21. Lite Brite--done during free time, careful.
22. Junk man--strong, quiet, eats sooner than others.
23. Paper passer--quiet, fast, done during free time too.



Brian de los Santos 3-19-75
I would like to apply for the
job of junkman. 2 I think I
wou[illegible] be good for this job
because I have done it before
at home. 3 I know I can do
[illegible]is job because I Love to do it
[illegible] can ask my Mommy if
would be good for this job.

Figure C1-7

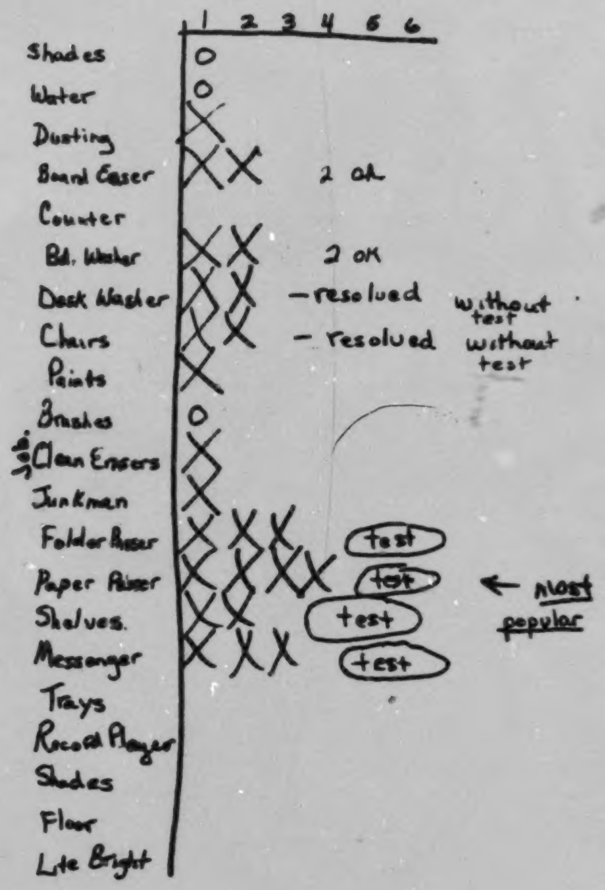


Figure C1-8

We discussed how adults got jobs, filling out a job application and being interviewed. The children decided to write an application for the jobs that they wanted. Each application contained the following information:

1. I would like to apply for the job of_____________.
2. I think I would be good for this job because ____ ______________________________.
3. I know I can do this job because________________.
4. Who knows you can do the job? (Reference)
5. Signature of applicant.
6. Date of application.

Figure C1-7 shows one child's application.

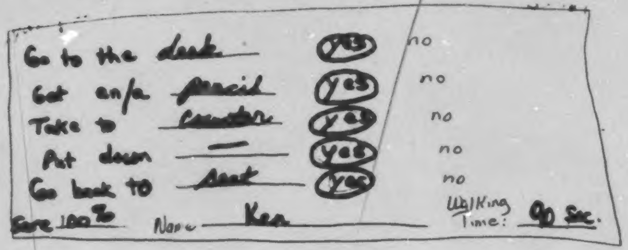
After the applications were completed, we sorted them and noted that several people had applied for the same job, while some jobs had no applications. The children felt that I should be the one to choose the person in those cases where more than one person had applied. When I refused, the class, after a long discussion, decided to make tests for the popular jobs.

The children first determined what the popular jobs were. They began looking through all the applications but kept having to flip back. Finally we decided that we needed to make a picture of our data. Figure C1-8 shows their resulting bar graph tally. The graph showed that more than one person had applied for the following jobs:

- board eraser
- board washer
- desk washer
- chairs
- folder passer
- paper passer
- shelves
- messenger

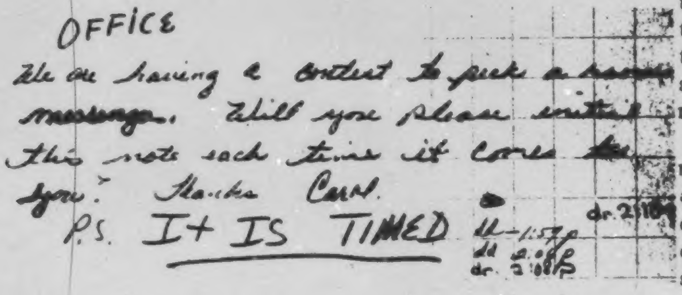
After looking at the graph, the children made revisions to the job list. They agreed that the jobs of board eraser and board washer could have two people working on them. The problems of desk washer and chairs were resolved without a test. The children also combined the duties of some of the jobs, such as having the duster also clean the windows and having the junk person also clean up after parties.

Tests were then devised for the four jobs of messenger, shelves, folder passer, and paper passer. Judges for each test were also selected.



Go to the desk [✓ yes] no
Get an/a pencil [✓ yes] no
Take to counter [✓ yes] no
Put down — [✓ yes] no
Go back to seat [✓ yes] no
Score 100% Name Ken Walking Time: 90 sec.

Figure C1-9



OFFICE
We are having a contest to pick a new messenger. Will you please initial this note each time it comes to you? Thanks Carol.
P.S. It IS TIMED

ll - 1:57 p
dd 2:08 p
dr. 2:08 p
dr. 2:10

Figure C1-10

The messenger test consisted of two main tasks:

1. Each applicant was timed, walking to and from the principal's office. Judges stood in the hallway to make sure no one ran. A runner was automatically disqualified.

2. Each person listened to the teacher tell him a list of things to do. For example, go to the board, get an eraser, take it to the counter, put it down, go back to your seat.

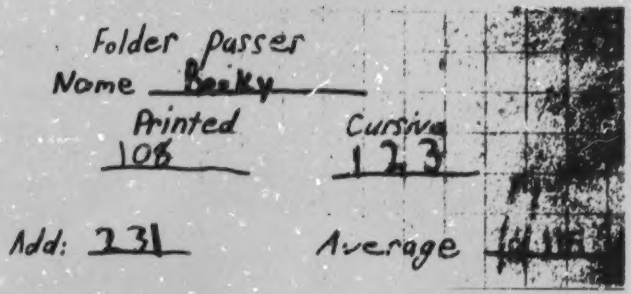
Judges used the forms shown in Figures C1-9 and C1-10 to record their observations. The timings were done by two boys who enjoyed using the thirty-second stopwatch. Because all the applicants did not make any mistakes on the second task, the child with the shortest walking time got the messenger job. All the walking times were written on the board and converted to seconds. The children were better able to compare these timings when they were all expressed in seconds. The children who did not qualify for the messenger job chose a job that had not yet been taken.

The test for folder and paper passers consisted of determining how long it took the applicant to pass twenty-three cards out (one card for each child in the room.) This was done twice with two different sets of cards. The first set of cards had each child's name printed on it. The second set of cards had each child's name written in cursive style. Again, the two boys timed the two passing times. If a child made a mistake by giving the wrong card to someone, he was automatically disqualified. With my assistance each applicant's average time was obtained. The judges used the forms shown in Figures C1-11 and C1-12 to record their observations. Again, those who did not get the passer job picked a job that was still available.

The shelves job consisted of only one activity. The applicant was timed on how long it took him to replace all the books neatly on the shelves. (The books were all removed for this test.) The judges used the form shown in Figure C1-13 to record their observation. The child who did not get this cleaning job took the remaining job.

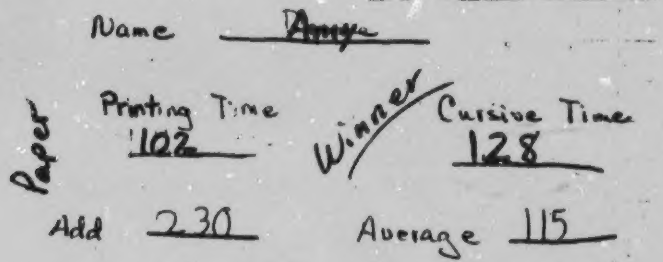
The children greatly enjoyed doing their jobs. The question of how long each job should last never came up; each child was just so pleased to have a job that everyone kept his job until the end of school.

Because the month of May began to get busy with parent conferences, we concluded the unit. The children were quite satisfied that they had resolved the major problems in the classroom. However, now and then they came up with ways of improving the room still further. The unit is one that could go on and on.



Folder passer
Name Becky
Printed 108
Cursive 123
Add: 231
Average [illegible]

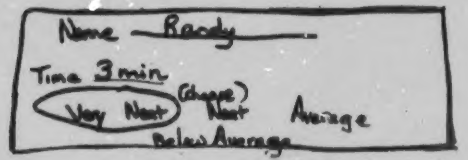
Figure C1-11



Name Amy
Paper
Printing Time 102
Winner
Cursive Time 128
Add 230
Average 115

Figure C1-12

Figure C1-13



Name Randy
Time 3 min
(choose)
[✓ Very Neat] Neat Average
Below Average

2. LOG ON CLASSROOM MANAGEMENT

by Carol Allen*
Cumberland School, Grades 3,4,5
Lansing, Michigan
(September 1974-May 1975)

ABSTRACT

After being in school for a few days without any established class procedures and rules, this combination class of third/fourth/fifth-graders talked about how the classroom was running. Agreeing that there were many disruptions that could have been avoided if there had been class rules, the children decided that the room would be easier to manage if they had some input into the establishment of the classroom rules and procedures. After more discussion about problems during the day, the children identified three main areas in which they should work: establishment of classroom jobs, development of classroom rules and election of a class government. Working every day on the challenge, the class divided into three main groups. As the need to tackle other problems arose, other small groups evolved, namely an election committee, a scheduling group, a noise group, and a newspaper group. By spring many groups had completed their tasks. The class was satisfied that the room was running smoothly, so one final group was established to oversee these procedures.

During the year I worked with approximately fifty-five children in a combination third/fourth/fifth-grade team-teaching situation. The composition of my class was altered twice, but many of the original group members remained with me throughout the year.

After being in school for a few days the class and I began to talk about how our classroom was run. Because no classroom procedures or rules had yet been established, we discussed what would happen if we continued to operate our room in this manner. The children quickly pointed out the need for some sort of organization in order that the room run smoothly. Several children offered samples of disruptive behavior that had occurred recently and that could have been prevented had there been classroom rules. We talked about who established the classroom procedures. Most of the children felt that it was the teacher who controlled the day-to-day activities in the classroom. However, someone suggested that perhaps the class would be easier to manage if the children had some influence in establishing the classroom rules and procedures. Because many children agreed with this suggestion, I asked the class to think of ways to make our classroom run smoothly. The class became very excited over the prospect of having some influence on classroom procedures; we divided into small groups to brainstorm ideas.

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*Edited by USMES staff

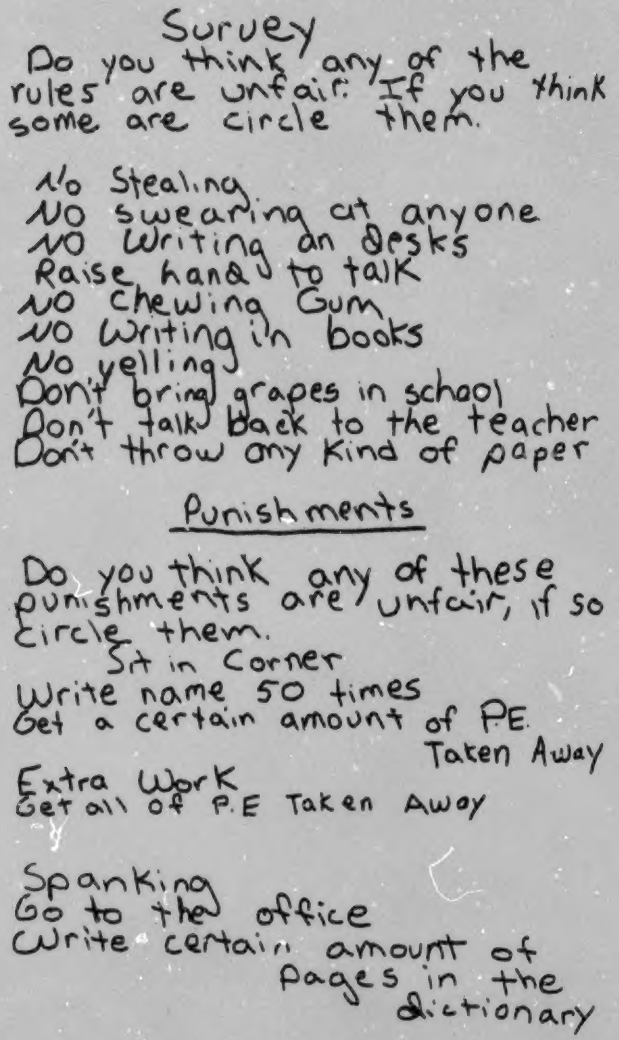
The children identified three ways they could help establish and maintain a smooth running classroom. Their ideas included the establishment of (1) a government (class officers), (2) classroom rules, and (3) classroom jobs. The children subsequently divided into these three main groups. Later they broke into still smaller groups.

During the course of unit activities small groups were constantly forming and dissolving, depending upon the current need for further investigations. Many times, too, children were involved in more than one small group. Although many of the groups worked concurrently during the year, this log documents each group's activities one at a time in order to provide continuity. During the year the following groups remained operative for a good length of time:

1. Rules/penalties
2. Election group
3. Council
4. Court
5. Police
6. Jobs group
7. Newspaper group
8. Scheduling
9. Noise pollution

Rules/Penalties Group

The rules group spent several days compiling a list of rules which they felt should be enforced in the classroom. When the children finished, they realized that many of the rules they had listed were extraneous, and they weeded these out. The children also compiled a list of penalties to levy on those who violated the class rules. The children agreed that there were three degrees of penalties: mild, medium, and terrible. The rules and penalties were listed on a ditto, and the following day the list was distributed to the



Survey
Do you think any of the rules are unfair: If you think some are circle them.

No Stealing
NO swearing at anyone
NO Writing an desks
Raise hand to talk
NO Chewing Gum
NO Writing in books
No yelling
Don't bring grapes in school
Don't talk back to the teacher
Don't throw any Kind of paper

Punishments

Do you think any of these punishments are unfair, if so circle them.
Sit in Corner
Write name 50 times
Get a certain amount of P.E. Taken Away
Extra Work
Get all of P.E Taken Away

Spanking
Go to the office
Write certain amount of pages in the dictionary

Figure C2-1

class for opinions and criticisms. Figure C2-1 shows the group's survey.

The group tallied the responses when all the surveys were returned. The children felt that the survey results were not valid because many children had not responded correctly. Rather than circling only those rules and punishments thought to be unfair, many children had circled all the rules and punishments. The rules group decided to design a new survey, adding some different rules and asking the respondent to circle those rules that he felt were needed to maintain a smooth-running classroom. Again, when the surveys were returned, the responses were tallied.

The rules group decided that in order for a rule or penalty to be adopted in the classroom, it had to receive 50% endorsement from the class. Because none of the rules or penalties obtained the necessary votes, the group spent several more days revising the list. The children finally realized that they would never obtain a 50% endorsement of every rule and penalty. Therefore, they settled for those which received the most votes. The final list of rules and penalties was posted in the room and appear as follows:

Rules	Penalties
No writing in or on the desks	Sit in corner
No swearing	Miss two days physical education; go to office
Raise hand to speak	Miss five minutes of physical education
No yelling	Miss physical education; sit in corner
No talking back to teacher	Sit in corner during physical education for two days
No writing in books	Sit in corner during physical education
No running	Miss physical education; talk with teacher; sit in corner
No fighting	Miss physical education; talk with teacher; sit in corner
No stealing	Sit in corner

Later, when the court was established, the chairman of the rules committee and the court judge decided upon the defendant's penalty. The above penalties were later replaced. (See Court section.)

A week after the rules group established the above classroom rules and penalties, one major problem occurred which was not covered by the rules, gum chewing. The children spent several days debating ways to regulate gum chewing in the room. Several children wondered if gum was even allowed in school. These children talked with several teachers and discovered that gum chewing was an individual teacher's decision, but it was soon to be submitted as a school rule. The group consulted me and I told them that if rules could be established and obeyed, chewing of gum was all right in our room. The group wrote the following rules for gum chewing:

1. Chew your gum wisely. Don't play with it.
2. Don't chew loudly.
3. Keep it (gum) in your mouth.
4. Put it (gum) in paper to throw away.
5. Don't blow bubbles.
6. Don't spit it (gum) on the floor.

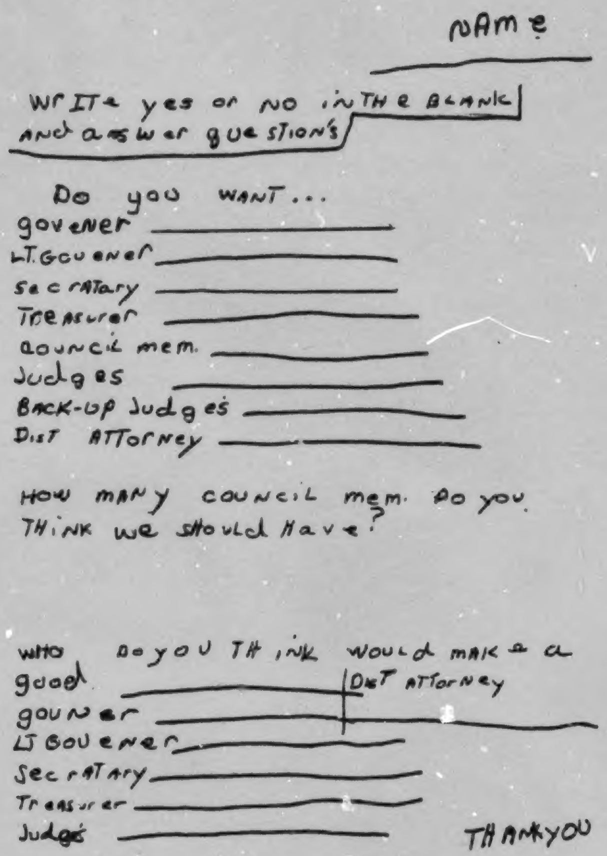
The group agreed that violators would be asked to throw their gum away.

At the beginning of January the rules and penalties group ceased to exist. Their duties of rules and penalty revisions were turned over to the class council.

Election Group

The children interested in establishing a class government discussed the functions of government and how the officials were elected to office. Several children were interested in setting up a class election to elect class officials. Others were interested in the duties of the judicial branch of government. These children decided to set up a court to handle disruptive behavior in the room. Not knowing really where to begin, the children decided to do some research in the library on what officials were needed to run a government and how the judicial and elective processes of government worked.

After two weeks of library research, the children investigating elected government officials made a list of officials they felt were needed to help run the classroom. They presented this list to the rest of the class.



NAME

WrITe yes or NO iNTHe BLANK
AND answer questions

Do you WANT...
govener
LT.Gouener
secratary
Treasurer
council mem.
Judges
BACK-UP Judges
DIST ATTorney

HOW MANY COUNCIL mem. Do you THINK we should Have?

WHO Do you THINK would make a good
DIST ATTorney
gouNer
LJ Gouener
secratary
Treasurer
Judge

THANKYOU

Figure C2-2

governor
lieutenant governor
secretary
treasurer
council members
judges
district attorney
lawyers to act as defenders

A survey was designed and circulated to determine the need for all the positions. Figure C2-2 shows the group survey. The class agreed to all the positions except treasurer; this position was eliminated.*

The group researching the election process learned about primary elections and nominating petitions. Using this information, they wrote election rules. Their rules were as follows:

1. Only children in sections D, E, and F of the room can vote in the primary and final elections. (My team teacher had sections A, B, and C.)

2. This election is for the following positions:

   governor
   lt. governor
   secretary
   two judges
   district attorney

3. Each person seeking an office (governor, lt. governor, etc.) must be nominated by obtaining ten signatures only from students in sections D, E, F. Parents and teachers are not allowed to sign these petitions. Also, a student cannot sign more than one petition for the same official position.

4. Only children ages nine to twelve can run for office.

5. Each child can vote only once.

The above rules were read aloud to the class at the next

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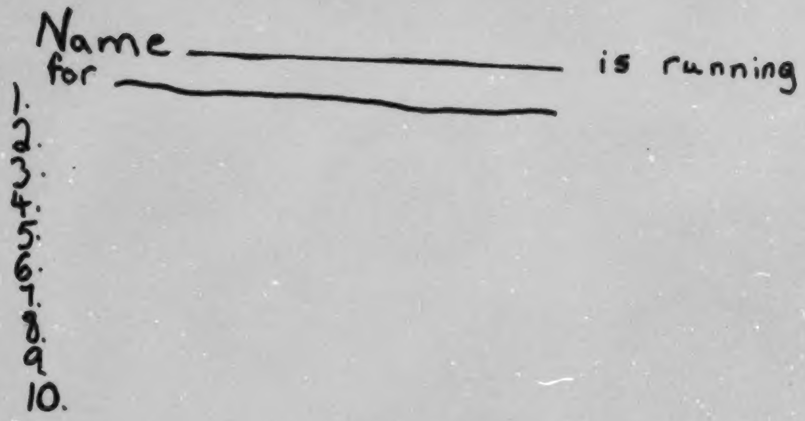
*The children might make a bar graph of the number of "yes" answers to the survey questions.

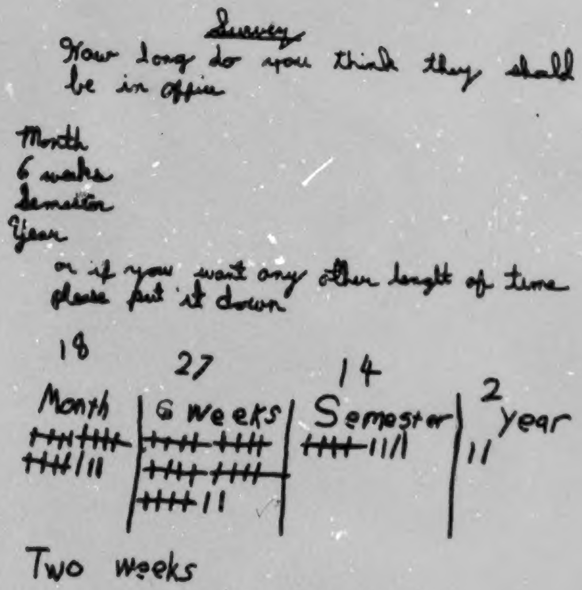


Name ____________________ is running for ____________________

1.
2.
3.
4.
5.
6.
7.
8.
9
10.

Figure C2-3

Figure C2-4



Survey

How long do you think they shall be in office

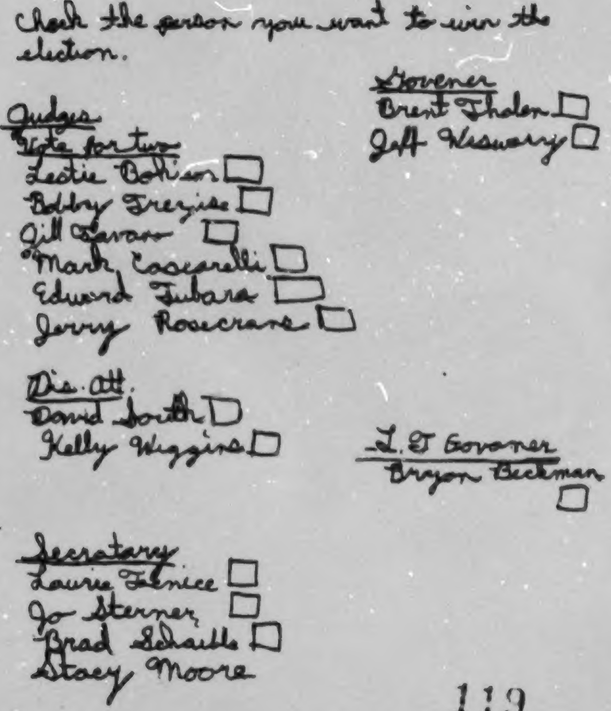
Month
6 weeks
Semester
Year

or if you want any other length of time please put it down

18	27	14	2
Month	6 weeks	Semester	year
𝍸𝍸 𝍸|||	𝍸𝍸 𝍸𝍸 𝍸||	𝍸||||	||

Two weeks

Figure C2-5



Check the person you want to win the election.

Judges
Vote for two
Leslie Bohison ☐
Bobby Trezise ☐
Jill Cavaro ☐
Mark Cascarelli ☐
Edward Tubara ☐
Jerry Rosecrans ☐

Govener
Brent Thalen ☐
Jeff Wiswary ☐

Dis. Att.
David South ☐
Kelly Wiggins ☐

L. T Govoner
Bryon Beckman ☐

Secretary
Laurie Tenice ☐
Jo Sterner ☐
Brad Schaible ☐
Stacy Moore

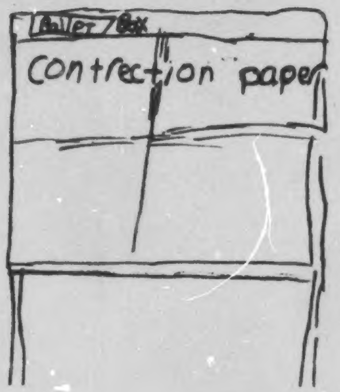


Figure C2-6

meeting. The class, by hand vote, approved all the rules except the third one. Many third graders felt it was unfair that eight-year-olds could not run for office. The class agreed that this was not fair and the minimum age requirement was lowered to eight years old. Blank petitions were handed out to show all those interested in running for office. Figure C2-3 shows a blank petition.

While they waited for the return of the petitions, the government group discussed how frequently class officials should be changed. The children could not agree, so they decided to survey the class. The survey and some results are shown in Figure C2-4.

After several weeks the election committee noted that petitions were not flooding in. Announcements were made for more people to run for office. The third graders were especially encouraged to run since few had yet done so. Several days later a few more petitions were returned. The election committee decided to go ahead with the primary election.

Before preparing the ballots, the signatures on each petition were checked to make sure they were not forged and did not appear on another petition. Figure C2-5 shows the final ballot they devised. The committee agreed on voting procedures and the date for the primary election:

1. Primary election will be held on Tuesday, October 8, 1974.
2. Voters will be called one by one to vote.
3. A list of all eligible voters will be made.
4. Before a voter enters the voting booth, his name will be crossed off the eligibility list.

They also designed and constructed a voting booth; one child's design is shown in Figure C2-6.*

On election day the voting went fairly smoothly. Two makeshift booths had to be quickly set up because the committee soon discovered that calling voters one by one took longer than they had anticipated. The voting was completed on the following day. Another problem that the committee discovered was that many children did not know what they were voting for and had to be given a quick explanation. Also, several children did not want to vote. Despite these

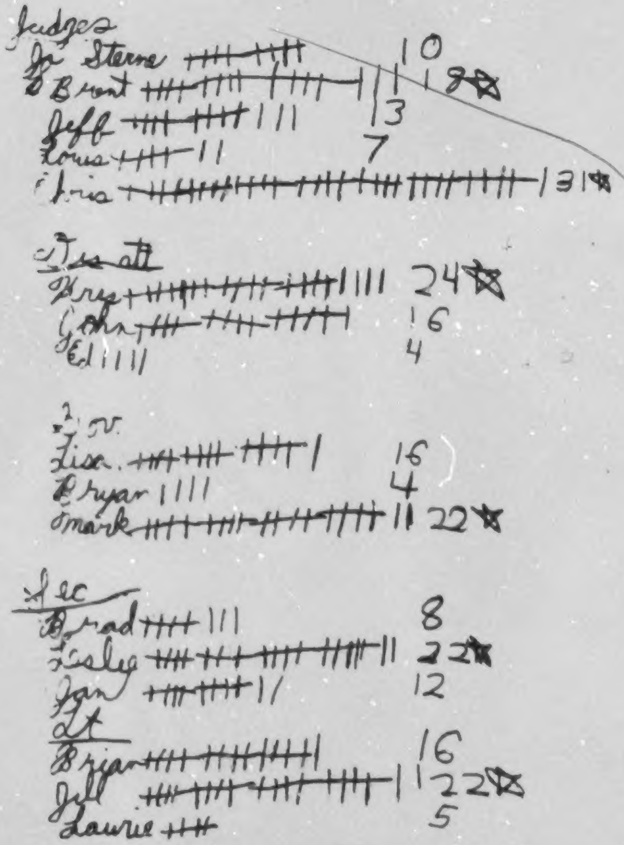
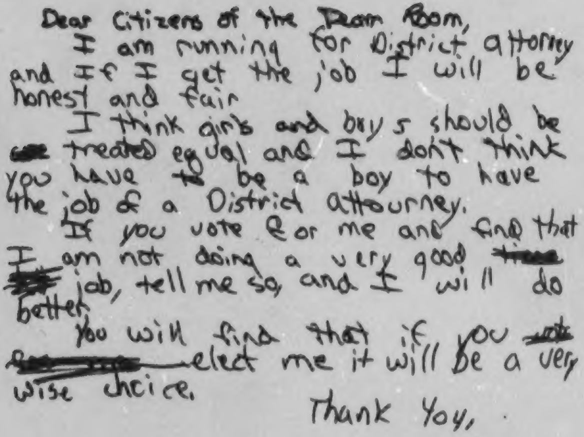

Judges
Jo Sterne 10
Brent 18
Jeff 13
Louis 7
Chris 31
Greg 24
John 16
Ed 4
V.P.
Lisa 16
Bryan 4
Mark 22
Sec
Brad 8
Lesley 22
Jan 12
Lt
Brian 16
Jill 22
Laurie 5

Figure C2-7

---

*The children might measure the children in the class to find the best height for the table in the voting booth. They may then be referred to the "How To" Card set, "How to Make a Bar Graph Histogram."--ED.



Dear Citizens of the Dream Room,

I am running for District attorney and If I get the job I will be honest and fair

I think girls and boy s should be treated equal and I don't think you have ~~to~~ be a boy to have the job of a District attourney.

If you vote for me and find that I am not doing a very good job, tell me so, and I will do better.

You will find that if you ~~vote~~ elect me it will be a very wise choice.

Thank You,

Figure C2-8

small complications the committee was satisfied that the election was successful. Since most of the election committee members were running for an office, the group had a non-candidate count the ballots. Figure C2-7 shows one child's tally of the ballots.* The primary election results were announced at the end of the day.

For the remaining part of the week the election committee prepared ballots for the final election, arranged to hold the election in an empty room next door, and set up more voting booths (desks with propped up tops). They also decided to have campaign speeches so that everyone would know who was running for what position. Figure C2-8 shows one child's campaign speech.

The final election was held on October 15, 1974. The eight voting booths were open from 11 a.m. to 11:30 a.m. to allow the voters to go whenever they had time during this half hour. This procedure proved to be very efficient because the voting was completed in twenty minutes. The ballots were taken home that same day by an election committee member and the results were announced the following day. The newly-elected officials spent several weeks researching the duties of each official.

The election committee next proceeded to set up an election for the council representatives. They spent several weeks requesting children to run for council. They decided that sections D and F could elect three councilmen, while section E could elect only two since section E contained only eight people. Just before the election, about half of the class had the opportunity to go to the state capital to observe the House of Representatives in session. Those children who were interested in running for council returned with a better understanding of what a council did. The council election took place on Tuesday, November 5, 1974. Seven representatives were elected.

Council

The newly-formed council, comprised of the class officers and council representatives, met the first Tuesday after the council representative election. I met with the group and together we decided that the council's prime responsibility was to assist me in coordinating all the groups. The group spent the first session confirming the chairmen of the existing groups.

---

*The children might check for possible errors by finding the total number of votes cast for each office.--ED.

In the ensuing months, however, the council became predominantly occupied with revising and making new classroom rules. Eventually, the rules and penalties groups were abolished, and the responsibilities of these two groups were given to the council. The council also had the power to set up special groups to study current problems. For example, the council felt that there should be no gum chewing in the room because the members had seen many children break the gum-chewing rules which essentially stressed chewing one's gum wisely. In order to provide evidence of these occurrences, the group appointed the newly-formed survey group to do an observation survey. After five days of observation the survey group reported that thirty-five children had violated the gum-chewing rules. The council unanimously voted to abolish gum chewing in the room. This new rule was announced to the class.

Noting the abundance of campaign posters still plastered all over the classroom walls, the council asked the survey group to determine the usefulness of the signs. The survey group conducted the survey and reported the results to the pollution group. The pollution group, in turn, made up new rules regarding hanging signs and posters in the room. The rules were as follows:

1. No more than two posters per candidate.
2. Poster had to be removed prior to election day.
3. No defacing of posters.

These rules were submitted to the council for approval.

By April the council was barely functioning. The children wanted to hold another election to elect new class officers and representatives, but I reminded tham that because the council did not have defined duties, its role in managing the classroom was pretty nonexistent. A group of eight children volunteered to write a list of council duties. The list included the following:

1. Make new rules.
2. Revise rules.
3. Issue permits to groups to try out new ideas.
4. With teacher's help, control police force; for example, appoint and fire police.
5. Attend all class meetings.
6. Listen to all points of view.
7. Contribute to discussion.

When the group presented their ideas to the class, the class voted them down, saying the room was already running smoothly without the council. The council therefore was not revived.

Court

The children who were interested in the judicial branch of government felt that a court was a natural way to deal with people who broke the rules. The children agreed upon those court officials necessary to hold court, but they did not have enough background to outline the duties of each court official. Their list of officials included a judge, a district attorney, a pool of lawyers, and a jury.

The children spent several weeks in the library looking up court official roles and court procedures. When they did not find enough details in reference books, the children questioned their parents. From her father one girl received quite a detailed explanation that she shared with the group. However, they discovered they did not understand the terminology and spent many hours looking up words in the dictionary. They finally decided that the only way they could really understand court procedures was to see a court in session.

The group persuaded one parent to help them arrange a visit to a court in session. After several weeks of planning and calling, the court group and the newly-elected officials (judges, district attorney, and governor) visited a court session in mid-October. Before going they compiled a list of what to observe, including the following questions:

> How is the room arranged?
> What does the judge do?
> What does the district attorney do?
> What do the lawyers do?
> What other people are involved?

After this visit to court, the group decided to set up a mock trial to have the officials practice their roles. Because they still had not set up definite procedures to follow, the mock trial was a flop. The officials were still unsure of what their duties were. The group finally decided to write down the duties of each court participant. The following list shows those duties:

Witnesses:

1. Sit down quietly. Wait for the lawyer to call you up to the box (witness stand).
2. Answer all the questions that you can. Don't say something against someone just because he may be your enemy.

Jury

1. Listen quietly to the crime.
2. Decide who's guilty and who's not guilty.
3. Gives slip of paper (verdict) to district attorney, who gives it to the judge.

Lawyers

1. Before he comes to court, he thinks of questions to ask witnesses, defendant, plaintiff.
2. Sits at designated desk upon entering court.
3. Gets ready to question.
4. When judge calls him, he can question.
5. He questions the witnesses, defendant, and plaintiff.

Judge and Head of Punishment Group

1. Examine the sheet of paper from jury.
2. Together they decide the punishment.

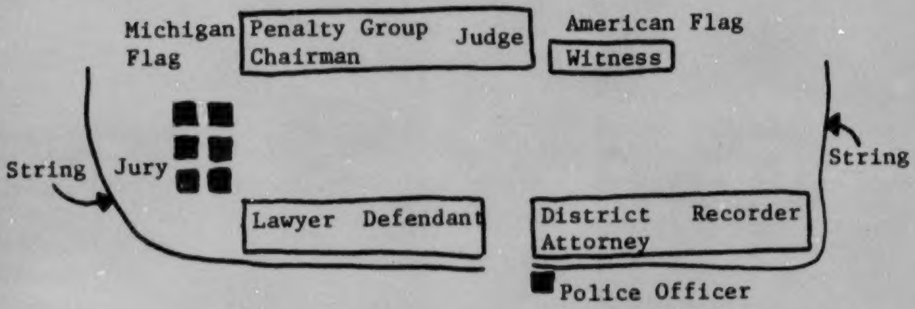
The group decided upon the following court rules.

1. The defendant and plaintiff each have a lawyer.
2. The district attorney and defendant pick the jury after volunteers have submitted their names (names placed in a box and six names drawn).
3. The jury alone decides who is guilty or not guilty.
4. Lawyers can have as much time as they need to ask questions.
5. The police can remove spectators from court if they are fooling around or are too noisy.
6. The jury has to pay full attention to the court proceedings.

Next, the group got together with the police group to decide on arrest procedures. They agreed upon the following procedures.

1. Each offender receives one warning before brought to court.
2. Police gives ticket to offender. Copy of ticket goes to district attorney who in turn makes court arrangements with the offender and his lawyer.

The court group spent several weeks trying out different arrangements for the court. Setting up court in an adjacent room proved to be too inconvenient and time-consuming. They eventually found a permanent place in the classroom where the court could be quickly set up. The children obtained permission to borrow the American and Michigan flags from the Girl Scouts meeting room. Signs were made to remind court participants of their roles and to remind the spectators to be quiet. (In the beginning the whole class was required to observe each court session. Later the class was welcomed but not required to attend.) The court was arranged as follows.


Michigan Flag
Penalty Group Chairman
Judge
American Flag
Witness
String
Jury
String
Lawyer
Defendant
District Attorney
Recorder
Police Officer

During the month of November the court began to hold sessions. Court began with the judge asking the defendant if he pleaded guilty or not guilty. If the defendant pleaded guilty, the judge and punishment group chairman decided on a penalty and no trial was necessary. Possible penalties included the following:

1. Stay in from physical education. Put head down on desk.
2. Stay in from physical education to write, "I will not disobey the rules," seventy-five times.
3. Stay in from physical education to write, "I will not disobey the rules," fifty times.

The judge and chairman agreed that a penalty would be less severe for a person who pleaded guilty than for a person who pleaded innocent and was later found guilty by the jury.

During the ensuing months, court procedures and rules constantly underwent revisions; most of the time decisions were made in the midst of a session. Major changes that occurred over the months were:

1. A second court was formed. The children soon discovered that witnesses and the defendants soon forgot the details of the incident because the trial took place several days later. The court group spent several weeks juggling court officials and the witnesses. Many times one witness was needed in both courts. The children decided they needed a list of when the trial would be held, who the lawyers were, what court the trial would be held in, and who the jury would be.

2. The selection of the jury was revised. Rather than relying on volunteers, the names of all the children in the room were put into a can. Fifteen names were drawn for each court. From these fifteen names the district attorney and lawyer chose six to act as the jury for a trial, carefully discarding friends of the defendant.

3. Court procedures became more formal. Under the newly-revised procedures, court began with the pledge of allegiance. The jury and witnesses were sworn in. A chalkboard was brought into court. For each case the following was recorded on the board:

   a. defendant's name
   b. the charge against the defendant

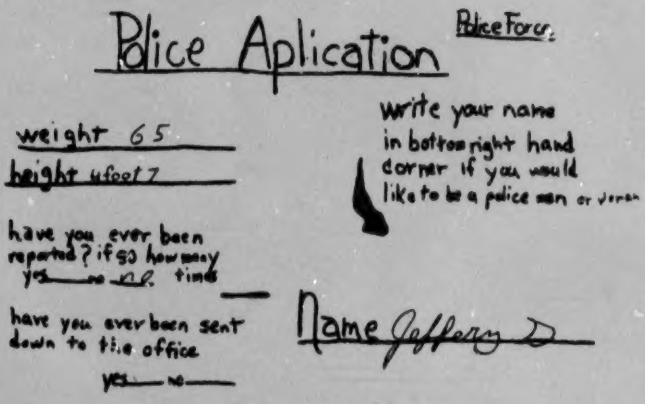
c. how the defendant pleaded
d. witnesses' names
e. the verdict

The lawyers gave a summary of the trial before the jury left to decide upon a verdict. The jury had to be in total agreement on the verdict or a new trial with a new jury was called. The defendant's sentence was determined by the judge, punishment group chairman, and the teacher. The jury could only recommend punishments.

By the beginning of May there were few violations. The class agreed that the court along with the police force were no longer needed.

Police

With one group setting up a court to handle misbehavior and another group making classroom rules, several children felt the room needed a police force to enforce the rules. Many children wanted to be policemen but no one wanted to organize the force. After five children participated in a four-hour program on criminal justice put on by the city police department, they designed an application form (See Figure C2-9.



Police Aplication

Police Force.

weight 65

height 4foot 7

write your name in bottom right hand corner if you would like to be a police man or woman

have you ever been reported? if so how many
yes___ no _ne_ times

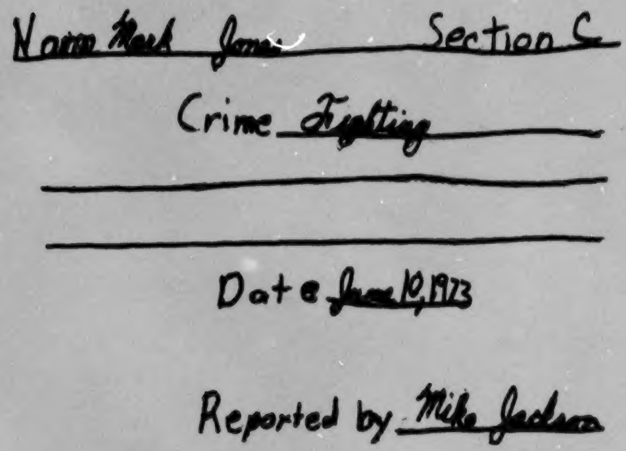
have you ever been sent down to the office
yes___ no___

Name Jeffery D.

Figure C2-9

A week later thirty-five interested children returned their applications. I pointed out to the group that thirty-five police officers to watch fifty-five children seemed excessive. The children agreed and decided to set higher standards. After behavior records were checked, eleven names were placed on a ballot and the class voted for six. Four boys and two girls were chosen for the first six-week term.

The police force met with the court group to decide on arrest and reporting procedures. They also obtained from the rules group a list of the classroom rules. The officers wrote these rules on paper and carried them everywhere. Figure C2-10 shows the ticket given to a violator.



Name Mark Jones Section C

Crime Fighting

Date June 10, 1973

Reported by Mike Jackson

Figure C2-10

During the months of December and January the police force began to cause problems in the classroom. Some of the problems included the following:

1. The police did not report friends.
2. Inconsistent reporting--one week no one was reported, another week everyone was.

3. Children complained that the police were spying on them.
4. The police were misbehaving and not getting reported.

We got together as a total class to discuss the problem of the police force. Unfortunately, it was a disaster. The class was split into two factions, and nobody would listen to one another or to me. The discussion became so heated and unreasonable that I finally decided to suspend the court, council, and police until we could figure out a solution to the police problem.

For several days the class did not do much. With the police force disbanded pressure eased and once again we tackled the problem. The class had been studying U.S. history. The children decided that the class needed a Bill of Rights. They decided on the following:

1. Right to be notified immediately when reported.
2. Right to have a lawyer.
3. Right to remain silent and not give evidence against self.
4. Right to be protected against police abuse.
5. Right to be protected against police getting in desks and taking belongings.
6. Right to speak freely in council.
7. Right to speak freely about beliefs.
8. Right to have freedom of press.
9. Right to be equal.
10. Right to vote on rules and officers.
11. Right to be protected against people lying about them.
12. Right to be treated with dignity and respect.
13. Right to be assured of fair selection and control of police.

The class agreed unanimously on these rights. They also agreed that a police force was a good idea but that the police needed training. They felt that anyone could go through the training but that final selection was up to me. Included in the training were the following guidelines:

1. Honesty in reporting
2. Show respect
3. Tell person reported
4. Give warning for minor offenses
5. Tell rights

6. Be fair
7. Know rules
8. Rules of evidence
9. How to tell if a rule is broken
10. Using good judgment.

The children then agreed upon the following revised classroom rules:

1. No fighting.
2. No running.
3. No shouting.
4. All school property should be cleaned at the end of the day.
5. Do not disturb other people.
6. Gum and candy is allowed but if gum, candy, or wrappers are found anywhere but in the wastebasket, the whole class is suspended from the privileges for one week.
7. Bathroom and drinks allowed anytime except when teacher is giving directions.

At the beginning of February, I worked with twenty children who wanted to be on the police force. We thoroughly discussed the class Bill of Rights and the class rules. Rules for the police force to follow were set. The rules were as follows:

1. Tell the reported person at once.
2. Don't touch the person.
3. Don't shout.
4. Get an adult in event of a fight.
5. Don't take other's things.
6. Be polite
7. Be honest.
8. Give warnings.
9. Get witnesses.

The twenty children were given a probation period of one week. During this period I evaluated each child's preference and made the final selection.

The police training was effective to the point where many children felt it was too much work to be a policeperson. Eventually several children dropped out. By the first of May the children realized that the police and court were no longer needed because no one was being reported. The children felt that the classroom atmosphere was extremely good, and so, over a few protests, the police and court were phased out.

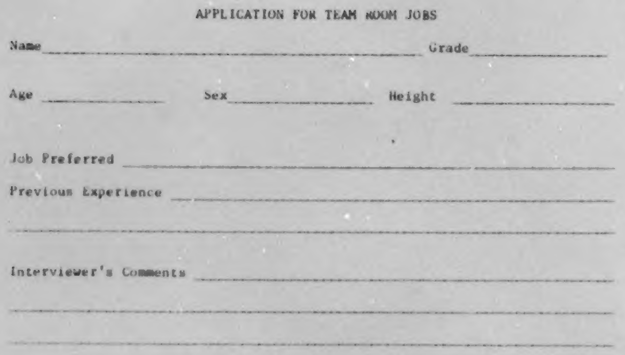
Jobs

The committee on jobs got off to a slow start. They began by listing all the jobs they felt should be done or were presently being done in the room. These jobs included the following:

- blackboards
- bulletin boards
- chairs (put on desks at night)
- fire drill chief
- job inspector
- books (straighten)
- bathrooms (tidy)
- sinks (clean)
- floors (pick up papers, books, etc.)
- physical education equipment
- messenger
- lights
- trash (empty into larger bins)
- plants (water)
- door holder
- audio-visual equipment

The group did not know what to do after the list was made. After I asked them what the duties of each job included, they agreed that job descriptions would be helpful. Several children began timing how long it took the present job holders to do their jobs. However, this activity soon ceased when the children realized that no one was limited by time and that there was always plenty of spare moments when the children could do their jobs.* The job descriptions took several days to write.

The committee chose to distribute jobs through job applications. The children examined several job applications which I had brought in. They decided what information was important and designed their own form shown in Figure C2-11.



APPLICATION FOR TEAM ROOM JOBS

Name________________________ Grade__________

Age __________ Sex__________ Height __________

Job Preferred ________________________

Previous Experience ________________________

____

Interviewer's Comments ________________________

____

____

Figure C2-11

The available jobs were announced to the class, posted on the bulletin board, and advertised in the classroom paper. An interested person filled out an application and was interviewed by a committee member. During the interview the applicant was asked why he wanted the job, what he thought the job work entailed, and what his qualifications were for the specific job. If the applicant qualified for the job, his name was recorded on a chart under the appropriate job.

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*The group might consider whether the time required for the job would influence children who were thinking about applying for the job.—ED.

Naturally, several jobs, such as boards, messenger, lights and plants, attracted more than one person. The committee agreed that other criteria on which to judge an applicant was necessary. They devised tests for each job to test the applicant's on-the-job performance. For example, the blackboard test consisted of erasing and washing the boards under a watchful eye of a committee member.

After all the jobs had been assigned, the committee agreed that because it had taken so long to assign jobs, jobs should change once a month.

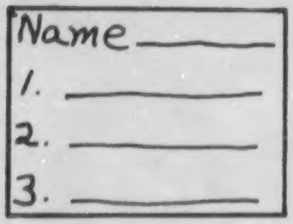
After several months the job committee noticed that more children were not doing their jobs, and those who were doing them often complained. During a group discussion the committee learned that their classmates were unhappy over the job situation because of the following reasons:

1. Jobs last too long.
2. It takes the committee too long to establish the job assignment chart.
3. Same people get the jobs. Job distribution technique is unfair.

The job committee became very defensive about their activities. They complained that it was hard to get people to do some of the more undesirable jobs, such as cleaning floors and bathrooms. They also claimed that they could not go any faster in the interviewing, testing, and setting up of the chart. After considerable discussion the committee consented to allow other children to devise a method of distributing the jobs while they made a more practical chart (a permanent chart with changeable name cards).

The following week the new method for job distribution was explained and shown. Each child who was interested in a job completed a slip of paper like that shown in Figure C2-12. The child was to list in order of preference the jobs he wanted. The slips were all placed in a box. Later they were drawn, one by one, from the box. The first person got his first choice job. The second person got his first choice job unless it was already taken, in which case he got his second choice job. This procedure continued until all the jobs were filled. If some jobs were not filled, another box, containing the names of the entire class, was used.

The above procedure for assigning jobs was found to be acceptable. With the new chart the committee agreed that jobs would rotate every other week.



Name ______

1. ______

2. ______

3. ______

Figure C2-12

Newspaper

In October several children started a classroom newspaper. The group felt that the paper would keep all the groups informed of what everyone was doing. In addition to group summary reports, the newspaper contained advertisements for jobs, announcements of upcoming elections and who the candidates were, reminders to obey the classroom rules, and a puzzle or fun page.

The first issue came out at the end of October. The group was not satisfied with it because it was messy and hard to read. To get more ideas on writing and assembling the paper, the group, with adult assistance, arranged a trip to the local newspaper plant. Later, they improved the legibility of the written edition.

In the spring the newspaper group expanded its circulation to include the lower grades, kindergarten through second. They organized themselves so that they could get news from all the classes.

Scheduling

As a result of the changes made in the teaching setup in late November, the class had to shift some of the children in order to distribute people evenly among the various groups. The newly-formed scheduling group was given the task of evaluating the existing groups and forming new ones. The group made a list of the existing groups which included the following:

council--elected
election--set up elections, set rules for election
rules/penalty group--make and revise rules, set penalties (group under council's authority).
police force--elected (only those with no record of misbehavior)
court--try violators, sets up court
newspaper group--keep all groups informed
jobs group--interview and hire people for jobs, write job descriptions

The scheduling group then formed the following new groups:

noise pollution group--cut down classroom noise
survey group--undertakes surveys for council and for other groups if so desired
scheduling group--schedule special meetings, parties, extra time to work on art projects, USMES small groups, etc.
records group--keeps records of arrests, trials, other pertinent class information
bulletin boards--maintain boards up to date.

The scheduling group divided the twelve groups into "A" and "B" groups. The "A" groups were scheduled to meet Monday, Tuesday and Wednesday mornings. Included in this group were

council
election committee
rules and penalties group
pollution group
survey group.

The "B" groups were scheduled for the same days but during the afternoon. These groups included

court
scheduling group
newspaper group
jobs committee
records group
bulletin boards group.

Court was in session on Thursday and Friday mornings and Thursday afternoons. Friday afternoons were reserved for class discussions.

The above schedule was put on a ditto and distributed to everybody at the next class meeting. Following explanations and questions, each person wrote down which group he wanted to be in. The scheduling group pooled all the requests and after much juggling of people to keep key people in certain groups, they announced the results after Thanksgiving break.

In January the group had to reschedule all the groups due to another change in the classroom setup. The afternoon time for group work was eliminated although the morning time was extended fifteen minutes. After a one-week trial of this schedule, the following new schedule was arranged because the court needed more time due to the increased number of cases:

court--10:00 A.M. - 10:20 A.M. Monday - Thursday
10:30 A.M. - 11:00 A.M. Friday
council--10:30 A.M. - 11:00 A.M. Tuesday and Thursday
class discussion--10:00 A.M. - 10:30 A.M. Friday
small groups meet--10:15 A.M. - 11:00 A.M. Monday-Thursday

In the spring the scheduling group ceased its activity.

Noise Pollution

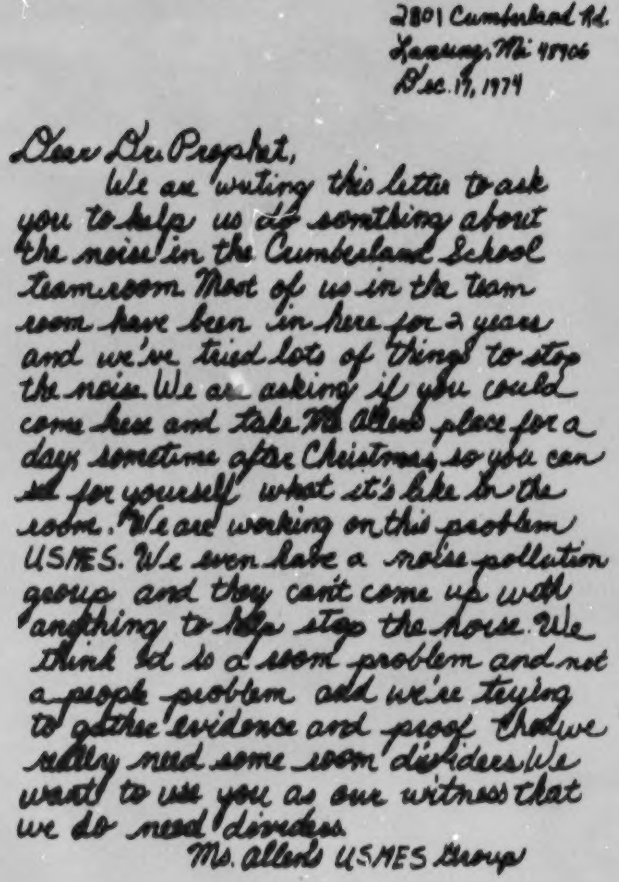
The noise pollution group evolved in late November after many complaints about the noise in the room. The group spent several weeks fumbling around because they did not know where to begin. They conducted a survey to determine class opinion of what noise pollution was and ways to control it. However, they did not know what to do with the data. Several children made "quiet" posters, but these were not effective. Finally, thoroughly frustrated, they got together with me, and we talked about other ways of tackling the problem.

The children agreed that perhaps they could make changes to the room itself to lessen the noise level. Our room is roughly a large square about the size of four classrooms. The room can be divided in half by drawing curtains. The entire room is carpeted. The children felt that the curtains were ineffective and suggested replacing them with sliding partitions.

The group outlined what they needed to do to obtain the room partitions:

1. Determine the cost of the partitions, installation costs, etc.
2. Seek permission from the principal and deputy superintendent in charge of school operations to investigate the possibility of installing room partitions.
3. Obtain proof that the room is still noisy with the curtains.

The group agreed that after they had gathered all the information, they would present it to the deputy superintendent and, if necessary, to the school board. The group divided into two parts, with half of the children researching partitions and the other half obtaining proof that the room was noisy.



2801 Cumberland Rd.
Lansing, Mi 48906
Dec. 17, 1974

Dear Dr. Prophet,

We are writing this letter to ask you to help us do something about the noise in the Cumberland School team room. Most of us in the team room have been in here for 2 years and we've tried lots of things to stop the noise. We are asking if you could come here and take Ms Allen's place for a day sometime after Christmas so you can see for yourself what it's like in the room. We are working on this problem USMES. We even have a noise pollution group and they can't come up with anything to help stop the noise. We think it is a room problem and not a people problem and we're trying to gather evidence and proof that we really need some room dividers. We want to use you as our witness that we do need dividers.

Ms. Allen's USMES Group

Figure C2-13

The noise group discussed ways of measuring the room noise. Someone remembered a unit on sound in the language book that we had studied at the beginning of the year. They dug out the book and found a noise level chart in it. They read that ninety-five decibels was the hearing damage level and that the average classroom noise level was about forty decibels.

The group looked into ways of getting a sound meter, but they were quite unsuccessful. One boy wrote the following letter to the "help" column of the local newspaper.

Ms. Carol Allens'USMES Group
Cumberland School
2801 Cumberland Rd.
Lansing, Michigan 48906
Phone: 487-6093

Dear Help:

Our classroom is in need of a sound meter that measures decibels. Can Help tell us where we can borrow one for free? Contact the above address.

Edward Fubara

They checked the school science department, but there was none. They went through the Yellow Pages looking for and calling businesses that sold or rented sound equipment. After several weeks of looking they gave up.

While most of the noise group members worked on obtaining a meter, some group members wrote a letter to a school board member requesting that he come to the room to note the noise. A letter was written and the class voted its approval. Figure C2-13 shows a copy of the letter which was sent. The class received no reply.

The partitions group went around the school to note the different kinds of partitions used in the building. They discovered that there were two types: a curtain and a vinyl-accordion type. The group talked about which one would probably keep the most noise out and decided to test each partition. Several children suggested having people yell on one side of the closed partition. A tape recorder on the other side would record the "yelling." Afterwards the group would decide which yelling was softest. One boy opposed the idea of yelling because the children could yell louder or softer each time they did the experiment. The group decided to use two tape recorders. One recorder played taped noises and the other recorded whatever noises came through the closed partition.

The group spent two days performing the partition test. They were pleased with their results and descended upon the principal to share their results and to seek permission to investigate partition prices. The principal was agreeable and offered to assist the children in looking up a vinyl door company. She also offered to call the company to obtain an estimate if the children could tell her how much partition was needed. The group realized that they really did not know where the partitions should go and returned to the room.

A few days later the group visited a place that installed walls. They returned quite in a state of shock, learning that it would cost three thousand dollars to replace the existing curtains with folding partitions. At first the children thought they could raise this amount of money by having bake sales and car washes, but after some thought they realized that this would be impossible. They began to evaluate seriously whether the need for partitions was absolutely necessary, and if it was, how they could get the school system to fund such a project. After considerable debate the children agreed to investigate other things to absorb classroom noise.

One idea for absorbing noise was to make art objects from sound absorbent materials to put on the walls and to hang from the ceiling. They spent several weeks trying to figure out ways to test materials. One experiment involved testing the absorbency of carpet samples with the idea that if carpets were effective in absorbing sounds, they would hang carpet samples all over the reading corner walls. They used two tape recorders, one with prerecorded noises. They covered the microphone with one layer of carpet, played the noises, and then checked the sound recorder to see how much of the noise came through.* They kept adding layers of carpets until nothing came through. They discovered that it would take three layers of heavy shag carpeting to stop noise completely. At this point they became frustrated because they knew they could not cover the walls with carpet. Instead, the children ended up lining the study carrels with styrofoam cups.

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*The children might discuss whether covering the microphones with carpet samples is a suitable test when the carpet is to be placed on the walls. A small section of a wall might be covered with varying amounts of carpet and the noise level measured a short distance away from the wall. If there is noticeable reduction in the noise level, the children might estimate the effect of a complete wall covering, taking into account the distance the different parts of the carpet would be from the point in question. --ED.

Because the noise group was not successful in obtaining a sound meter to measure noise levels, the class decided to pinpoint the times during the day when the room was the noisiest. We agreed that for several days we should keep track of the times during the day that people were disturbed by others. After three and one-half days we got together as a large group to assemble the data. It was discovered that about 50% neglected to keep records, but we decided to record what we had. They had me put the times of the day on the board and people raised their hands if they'd been disturbed at that time (or rather in a fifteen-minute period prior to that time). The tally appeared as follows:

Time of Day	Number who thought room was noisy	Time of Day	Number who thought room was noisy
8:45 a.m. - 9:00 a.m.	𝍸 ||||	12:45 p.m. - 1:00 p.m.	𝍸
9:00 a.m. - 9:15 a.m.	|	1:00 p.m. - 1:15 p.m.	|||
9:15 a.m. - 9:30 a.m.	|||	1:15 p.m. - 1:30 p.m.	||
9:30 a.m. - 9:45 a.m.	|	1:45 p.m. - 2:00 p.m.	𝍸 𝍸
9:45 a.m. - 10:00 a.m.	𝍸 𝍸 𝍸	2:00 p.m. - 2:15 p.m.	||
10:00 a.m. - 10:15 a.m.	||||	2:15 p.m. - 2:30 p.m.	|||
		2:30 p.m. - 2:45 p.m.	𝍸 ||
10:45 a.m. - 11:00 a.m.	𝍸 |	2:45 p.m. - 3:00 p.m.	𝍸 ||
11:00 a.m. - 11:15 a.m.	||||	3:00 p.m. - 3:15 p.m.	𝍸 ||||
11:15 a.m. - 11:30 a.m.	𝍸 |	3:15 p.m. - 3:35 p.m.	𝍸 ||||

The class agreed that the noisiest times occurred--

1. when children came into the room
2. during break
3. at the beginning of USMES group work
4. when children left the room.

By this time a lot of people who had not kept records were sorry they had not and wanted to do it again. So, as a class they decided to each make a chart and record with a tally mark every time they thought it was too noisy in the room. I also put a large chart on the chalkboard so that the aide and I could record our observations.

Three days later the class pooled all the observation data. Each person reported the number of times during each fifteen-minute period for the past two and one-half days he felt it was too noisy. The final chart appeared as follows:

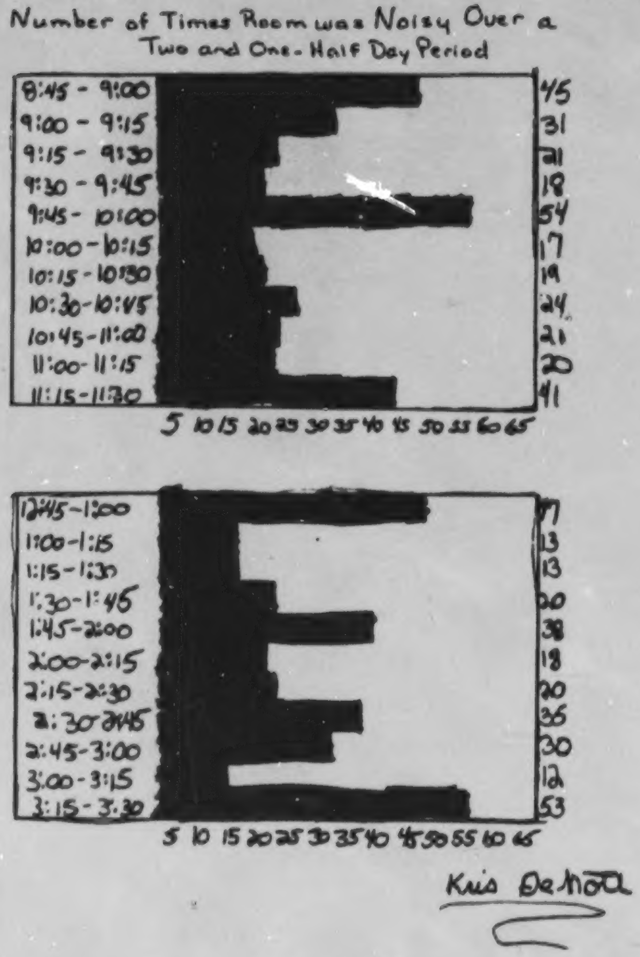


Figure C2-14

Number of Times Room was Noisy Over
a Two and One-Half Day Period

Time of Day	Total Tally	Time of Day	Total Tally
8:45 - 9:00	45	12:45 - 1:00	47
9:00 - 9:15	31	1:00 - 1:15	13
9:15 - 9:30	21	1:15 - 1:30	13
9:30 - 9:45	18	1:30 - 1:45	20
9:45 - 10:00	54	1:45 - 2:00	38
10:00 - 10:15	17	2:00 - 2:15	18
10:15 - 10:30	19	2:15 - 2:30	20
10:30 - 10:45	24	2:30 - 2:45	35
10:45 - 11:00	21	2:45 - 3:00	30
11:00 - 11:15	20	3:00 - 3:15	12
11:15 - 11:30	41	3:15 - 3:30	53

We could tell by the chart pretty much when the noisy times were but I asked each of them to make a graph so that when we did the survey again, we could show the comparison in graph form. One child's graph is shown in Figure C2-14. All were pleased with their graphs; we spent a few minutes at the end of the hour talking about what the graphs showed. They decided it showed that most people felt it was too noisy during coming and going times, during break, and when we changed from subject to subject.

After vacation it was difficult to get the class interested in doing something about the noise survey results. The class finally broke into three groups to work on the times that had been identified as being the noisiest.

1. One group tried to figure out a way to keep the noise down during break without taking breaktime away. One suggestion was to have everyone take a break, including those who had previously tried to study through this time. A variation of this suggestion was to ban game activities unless the whole group participated. This latter suggestion was accepted and followed with excellent results.

2. Another group worked on the problem of getting the safety patrols to enter and exit the room quietly. They suggested to the class that we have recreational reading from 8:45 A.M. to 9:00 A.M. so that the patrols could enter during this period, and the whole class could start regular reading at the same time without interruption. The class agreed to try this plan for one week. A checker was posted in the hall to remind the patrols to enter quietly. However, as the room was already quiet when they entered, they automatically came in without making much noise. The group passed out a questionnaire asking whether people felt it was much quieter when the patrols entered; an overwhelming majority felt that it was. This procedure was therefore used when the class came in from lunch. The class continued this practice until the end of school.

3. A third group worked on the hallway noise problem. This noise occurred when the classes switched rooms. The group soon discovered that the other classes would not cooperate with their suggestions of lining up and using monitors. The group finally became discouraged and decided that this problem was really a teacher's problem. They felt that it probably did not really matter whether the children were noisy between classes because people were not trying to do quiet things at that time anyway.

In April the class learned that the school district wanted to divide our classroom permanently next year. However, because of the present lack of funds the project was postponed. I am sure that the partition group had some effect on this change, having written to the Deputy Superintendent in charge of operations and talking with their parents at home.

By mid-April, interest in the Classroom Management challenge had waned. The class agreed that at this point the problem was to maintain the existing groups that helped manage the classroom. Several tasks were combined so that they could be managed by those eighteen children who wanted to continue. They formed three gorups:

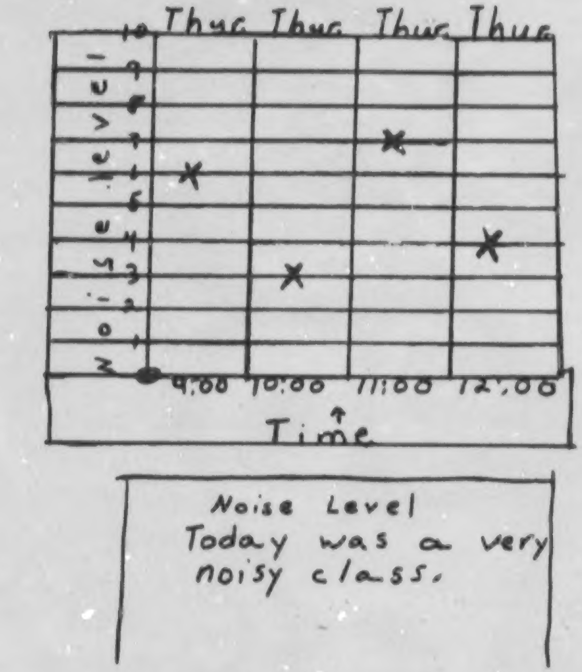
1. noise
2. court, council, police
3. newspaper, jobs

By mid-May the Classroom Management group felt quite satisfied that they had established and were maintaining a smooth-running classroom. Discipline was good, the noise level was lower, and the jobs were being assigned in a fair way.

3. MINI-LOG ON CLASSROOM MANAGEMENT
Noise

by Sandra Baden*
Lafayette School, Grade 4
Washington, D.C.
(September 1974-March 1975)

Leora Hochstein Oct. 24,



Noise Level
Today was a very noisy class.

Figure C3-1

ABSTRACT

This resource teacher worked approximately two hours per week with a fourth-grade class on the noise problem in the classroom. The class conducted a survey to identify when the room was the noisiest. The survey required each child to rate the noise level at one-hour intervals. The rating scale ranged from one (lowest) to ten (highest). The class attempted to devise a way to compare noise levels using tape and sound recorders with socks to muffle the microphone; however, this experiment failed. The class then decided to go ahead and make changes in the room. Agreeing that the room needed more barriers to absorb sounds, the children designed and constructed two walls made from Tri-Wall and egg cartons. They also constructed two desk carrels that were insulated with egg cartons. In order to determine the number of egg cartons needed, the children drew to scale both the surface to be covered and an egg carton. They then compared the number of graph paper squares required for the surface and the number required for an egg carton. The class was finally visited by a man who took audiometer readings of the sound level in the four corners and center of the room both with and without the walls and insulated carrels. The results showed that the egg carton walls had reduced the sound level by five to ten decibels.

During the year I worked with a class of fourth graders on the noise problem in the classroom. Upon entering the classroom one day, I commented on how noisy the room seemed. We talked about ways we could lower the noise. (The class agreed that it would be unrealistic to try to eliminate all noise.) The children suggested the following ideas:

- change the seating arrangement
- insulate the study carrels or build new ones
- write notes
- learn and use Morse Code
- use hand signals

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*Edited by USMES staff

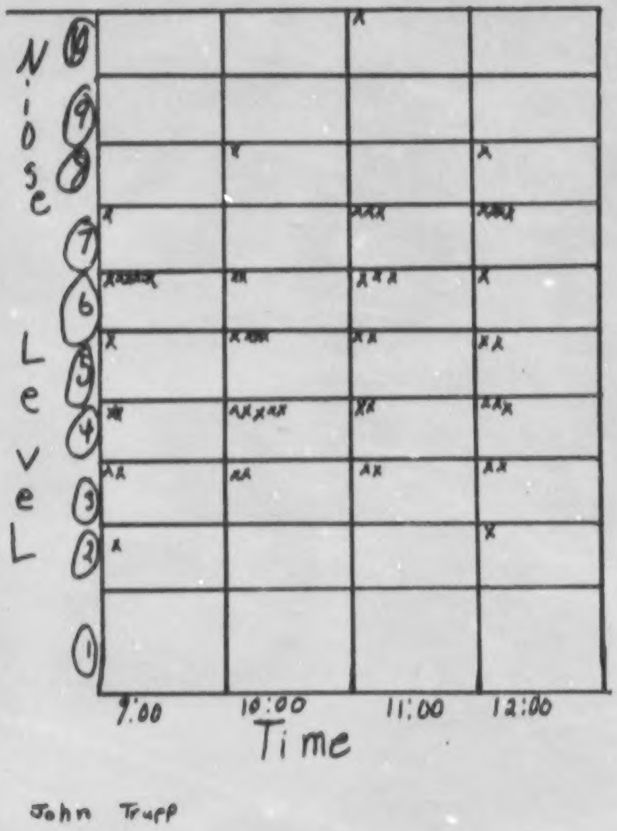

Figure C3-2

Before they could implement any changes, however, the class agreed that they should try to determine when the room was noisiest. Also, they agreed that they needed to find some way to measure the noise level within the room.

The class determined when the room was noisiest by rating the level at one hour intervals. Noise levels ranged between one (lowest) to ten (highest). From 9:00 A.M. to 12:00 noon each child rated on the hour the noise level using this one-to-ten scale. Figure C3-1 shows one child's chart. The individual ratings were then combined on one large form. Figure C3-2 shows the cumulative class ratings. The class noted that at 9:00 the room was noisier than at 10:00.* The children agreed to rate the noise levels again the following day while making an effort to be quieter.

The class made an attempt to set up a method for comparing noise levels. They used a tape recorder, a sound recorder, and seven socks. Measuring the distance between the tape recorder and sound recorder (6 feet), the children recorded the sounds from the sound recorder seven times, each time adding one more sock to cover the microphone. This procedure was tried several times, and each time the children felt that there was no difference in noise level between the recording with zero socks and the recording with seven socks.** The class gave up at this point but offered the following possible ways to make this method work:

1. Compare sound levels between zero socks to a large number of socks, say forty.
2. Change the distance between sound and tape recorders.
3. Put new batteries in both recorders.
4. Try muffling the microphone with other sound-absorbing materials.

Before we abandoned the noise measurement problem, we discussed the possibility of getting Mr. W., an expert on speech and hearing, to come and measure the classroom noise.

The class was eager to make physical changes in the room

---

*The children might keep a tally of the number of times the noise was disturbing during each half-hour period. This would take into account increases in noise level during each interval.--ED.

**Some tape recorders have automatic volume controls which make it impossible to get results from this experiment. --ED.

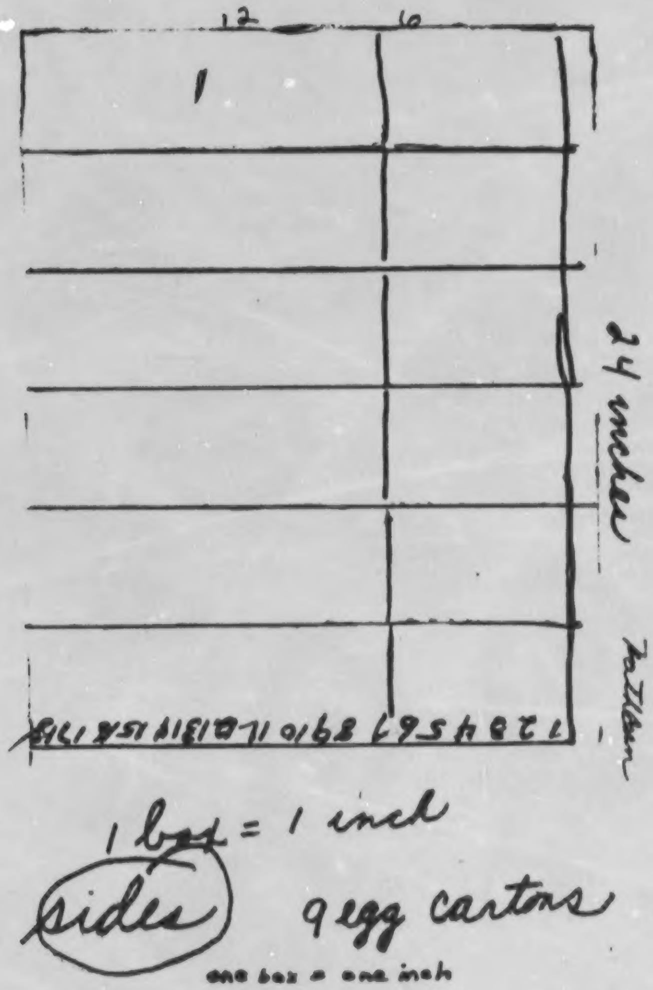

Figure C3-3

to lower the noise. Without much discussion they agreed that some sort of additional walls and insulation on their desk carrels would be effective. They also agreed that making carrels for those desks without them could also help. They voted to make two walls, one hanging (from the ceiling) and one standing, and two carrels for desks, one with insulation on the inside and one with insulation on the outside.

We discussed which materials absorbed sound best and then chose a material which was effective and readily available. The children quickly ruled out fiber glass insulation because it was too expensive and because "it gets into your hands." Another suggestion was the use of sponges. The class finally voted for my suggestion of egg cartons as these seemed abundant and cheap.

The children spent several days deciding how many egg cartons they needed for the carrels and walls. Before breaking into two groups, the class decided that the groups could easily determine the number of needed egg cartons by the following procedure:

1. Measure one of the desk carrels to determine dimensions of the two sides and center. Decide how big to make the walls.
2. Measure length and width of an egg carton.
3. Draw on graph paper a scale picture of carrel sides and walls and of egg carton. Compare the number of squares the egg carton occupies with the total number of squares the wall or carrel side occupies.

The class measured an egg carton and found it to be twelve inches by four inches.

The Carrel Group determined that they needed nine cartons per carrel side. They measured one of the desk carrel sides and found it to be twenty-four inches by eighteen inches. Using a scale of one square on the graph paper equals one inch, the carrel side and an egg carton were drawn accordingly. The children counted the number of squares the egg carton occupied and compared this amount to the carrel side. They determined that one side required six full cartons and six half cartons. One child's drawing is shown in Figure C3-3.

The children then measured the carrel center piece and found it to be twenty-four inches by twenty-four inches. They drew this center piece on graph paper using the same scale of one square equals one inch. They quickly determined that the center piece required twelve egg cartons.

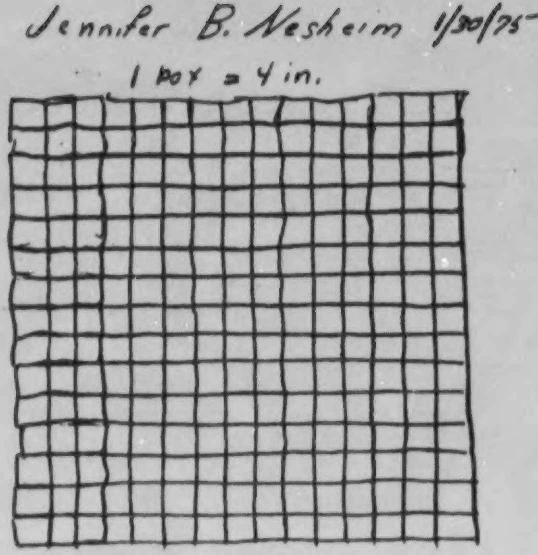

Figure C3-4

The children added the number of cartons for the two side panels to that for the center piece and got a total of thirty cartons required to insulate a study carrel.

The children glued the egg cartons onto Tri-Wall panels cut to the dimensions of the carrel. The children noted that the carrel with the cartons on the inside provided very little working space. They liked the carrel with the cartons glued on the outside.

The Wall Group decided that walls five feet by five feet would adequately absorb some of the classroom noise. For each wall they converted the feet measurements to inches and then drew the wall to scale on graph paper using the scale of one square equals four inches. They compared the egg carton size drawn to the same scale with the wall size and found that they needed seventy-five egg cartons for each wall. Figure C3-4 shows one child's scale drawing.

The children spent several days gluing the egg cartons onto Tri-Wall pieces. The standing wall was held upright by two one-foot-square Tri-Wall "feet" attached by slotting the wall. The children glued the cartons with the flat side down. The completed wall looked so nice that they decided to put seventy-five additional cartons on the other side of the wall. One group of children decided to make another standing wall to be placed near the door. One child commented that all the sound would be absorbed and trapped inside; at the end of the year he would open all the cartons, and we would be able to hear all the noise made since the wall was constructed!

The children next tackled the hanging wall. They spent a considerable amount of time debating how to connect all the cartons. One of the ideas involved punching holes in the cartons and stringing them together. The children looked at all the cartons and vetoed this idea. They decided that a more efficient way would be to use a large needle and yarn and "sew" the cartons together. Working in the Design Lab, they spent two days sewing five columns of egg cartons together. In assembling the wall, they sewed the first two rows together with very heavy string. They left the remaining thirteen rows hanging free. The hanging wall looked like the drawing in Figure C3-5.

Because the wall was fairly delicate, the children felt that it should be hung in a fairly permanent place. The children agreed that they needed to determine the weight of the wall in order to decide where it could be hung. Three ideas were suggested on ways to weigh the wall:

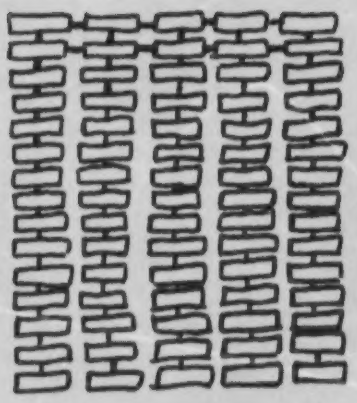

Figure C3-5

1. Weigh two people, then weigh them again holding the wall. The wall weight equaled the difference between the total weight and the weight of the two children.
2. Tie the wall to the scale.
3. Weigh one egg carton, then multiply by seventy-five.

One group of children tried the first method of weighing. Most of the class decided that the third method was easiest. Someone noted that some of the cartons were made from styrofoam and others made from cardboard. The class appropriately altered their plan. They decided to weigh each type of egg carton and multiply each by the appropriate number contained on the wall.

The children weighed each type of egg carton to determine the total weight of the wall. The cardboard carton weighed two ounces; the styrofoam carton weighed half an ounce. The children made a chart to record the number of styrofoam and cardboard cartons there were in each column. Their resulting chart appeared as follows:

	cardboard	styrofoam
column 1	13	2
column 2	13	2
column 3	13	2
column 4	14	1
column 5	13	2
TOTAL	66	9

To obtain the total wall weight, they added the total of 66 cardboard cartons times 2 oz. (132 oz.) to 9 styrofoam cartons times ½ oz. (4½ oz.). The total weight obtained was 136½ oz. They did not have any problems with the above multiplication but did have trouble converting the ounces to pounds. One child finally drew sets of sixteen and counted the number of sets in 136½ oz. Rounded off to the nearest ounce, the weight of the wall was determined to be eight and one half pounds.

The class agreed to hang the wall against a classroom wall when it was discovered that the carton wall was too long to be suspended from the ceiling in the middle of the room. (Tall people would bump into it.)

In the process of moving the hanging wall from the Design Lab to the classroom, many of the cartons fell off. The children rebuilt the wall using heavy twine in place of yarn. In order to thread the needle, they used a piece of wire, first attaching the twine to the wire and poking the wire through the needle hole. A recalculation of the weight of the wall was necessary because the children decided to alternate rows of styrofoam and cardboard cartons.

In March Mr. W. arrived to measure the noise levels in the classroom. He talked about the various parts of the ear, what their functions were, how sound travelled through air, how it was measured, and the noise levels of various sounds, such as whispers, a jet engine, etc.

Using an audiometer, Mr. W. measured the sound level in the four corners and the center of the room, both with and without the standing and hanging walls. Figure C3-6 shows the measurement results before and after the walls. All measurements were taken at the children's ear level. The children noted that the walls did have a slight effect in lowering the noise level. Mr. W. noted that the center of the room was the noisiest area. The children greatly enjoyed the visit and agreed that something should be done about the noise at the center of the room. They moved one standing wall and several of the carrels toward the center to reduce the noise level. In addition, the children decided to move a wall near the lockers so that the noise would not bounce off them.

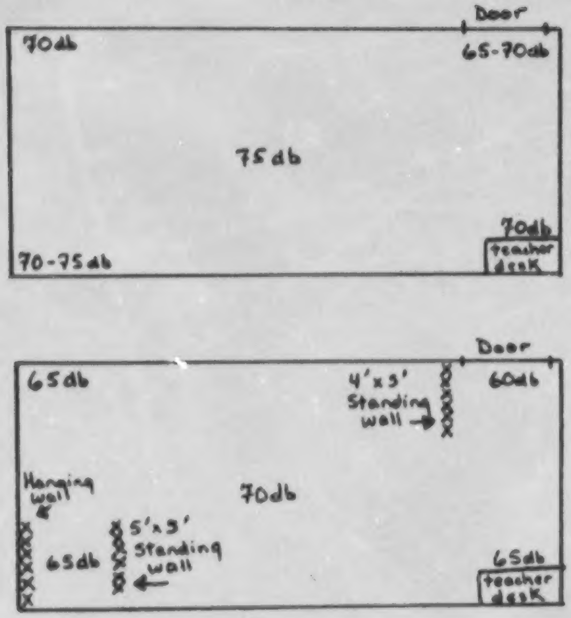

Figure C3-6

4. MINI-LOG ON CLASSROOM MANAGEMENT
Classroom Economic System

by Robert Farias*
Adams School (Grade 6)
Lexington, Massachusetts
(September 1972-June 1973)
(September 1973-June 1974)

ABSTRACT

This sixth-grade class worked every afternoon in setting up classroom jobs and a banking system, based on play money, in response to their desire to keep the classroom in good order. The children agreed on a weekly allowance and then listed all the possible things in the room that they could purchase with this money. This list included supplies as well as privileges. The price of an item was based on its overall desirability, as determined by having each child rate all the items from most to least desirable. The individual ratings were tallied onto one chart, and the total votes per rating were weighted with points. By multiplying the points by the number of votes for each rating, and adding up the totals for each rating, the children obtained a total score for each item. By comparing each item's total score, the children assigned prices accordingly. The class also made a list of classroom jobs and their responsibilities. The desirability of each job was again determined through individual ratings, and the class agreed on salaries based on each job's total score. The length of time the job should last, fair ways to distribute jobs, and the determination of who should levy fines and inspect jobs were also dealt with.

A banking system has been part of my classroom routine for several years. The classes have established the system in basically the same manner each year. This log includes documentation from two classes (1972-73 and 1973-74) with the major portion from the latter year.

The problem of keeping the room clean during the 1973-1974 year arose after several physical changes had been made in the classroom in response to the challenge of making the classroom a better place to learn and be in. The children talked about ways to keep the room in good order and the consensus was that classroom jobs were necessary. Many children, however, were not too enthusiastic over the idea of being assigned a job. The class discussed ways to make the jobs more appealing and everyone agreed upon one incentive: money! Immediately, the idea of a miniature economy in the classroom arose. The children became quite excited.

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*Edited by USMES staff

We talked about money first. The children agreed that the money would be used to buy class supplies and privileges, such as extra drinks at the water fountain. Several children wondered how we could raise enough money to begin the classroom economy. Before the suggestions of bake sales, car washes, etc., could get out of hand, I suggested the use of play money. The class immediately agreed that play money would certainly be more practical than real money. The class debated whether to use the Monopoly game money or to make their own and they decided to make their own. The problems of counterfeits and the storage of money were raised. To prevent counterfeits, the class felt that my signature should be on each bill. A sample dollar bill from the 1972-73 class is shown in Figure C4-1. To handle amounts of less than one dollar, the students also made quarter, dime, nickel, and penny bills. A committee was set up to make the designs for each denomination.

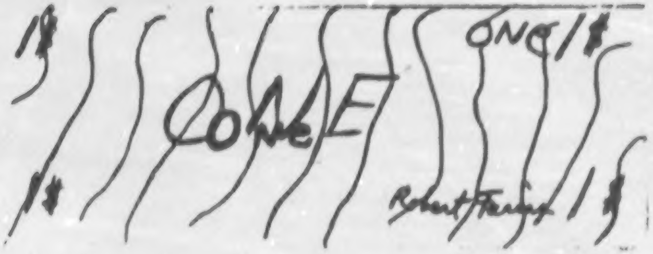


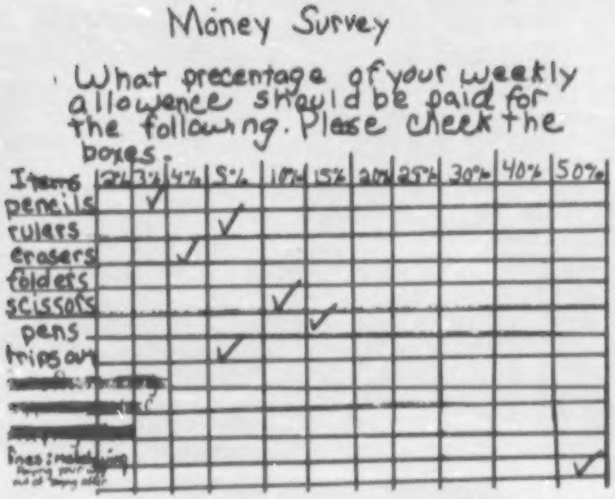
Figure C4-1

We talked extensively on ways to prevent money from being stolen from the banker's box. Many elaborate designs for burglar alarms as well as vaults were offered. Finally after much time had elapsed someone announced that all these elaborate safety devices were ridiculous because the money had value only for the children in this class and everyone in the class would know about the alarm systems! The class agreed and decided that trust was the best solution to the whole problem.

Many questions and issues surfaced as we began organizing the classroom economy, and so we decided to list everything that had arisen so far.

Classroom jobs

1. What kind of jobs need to be done in the classroom?
2. How much salary should each job be paid?
3. How should the jobs be assigned?
4. How long should the person hold the job?
5. Who and how should it be judged whether a job was well done or not?



Money Survey

What precentage of your weekly allowence should be paid for the following. Please check the boxes.

Items	2%	3%	4%	5%	10%	15%	20%	25%	30%	40%	50%
pencils		✓									
rulers				✓							
erasers			✓								
folders											
scissors					✓						
pens						✓					
trips out				✓							
[redacted]											
[redacted]											
[redacted]											
fines: [illegible] buying your way out of staying after											✓

Figure C4-2

Money

1. How much allowance should everyone get? What are our needs? What prices should be charged for purchasable items?
2. How can we prevent money from being stolen?

The class felt that a logical point at which to start would be to establish the amount of the weekly allowance. Many amounts were suggested and pretty soon the children realized that the amount was very arbitrary because prices for purchasable items had not yet been established. Each child wrote down what he/she felt was a suitable allowance per week. This survey revealed that most felt $4 per week was adequate.

Many children felt there were not many things they could purchase in class. However, in a short time a list of eleven items was generated and included the following items:

pencils
rulers
erasers
crayons
scissors
notebooks
paper
folders
pens
drinks at the water fountain
fines (e.g., buy one's way out of staying after school)

The class tried to establish the price of the above items by determining what percentage of the $4 allowance each of them was willing to spend for one item. A survey similar to the one made in 1972-1973 was designed and distributed (see Figure C4-2 for the 1972-1973 survey). Unfortunately, once the surveys were tallied the children could not deal with the data because many in the class did not have a true understanding of decimals and percentages and therefore did not respond to the survey properly.*

---

*During a math period the class could be introduced to percentages and decimals. The class could recheck individual surveys to determine if all the percentages that each respondent checked on the survey totaled 100%. A tally of the class survey results could be obtained and the median percentage for each item found. (If the total of the medians did not add up to 100%, some adjustment could be made.) The children could then multiply the median percentage for each item by $4 to determine the cost of each item.--ED.

	Total Votes for Each Item's Position											
POINTS	1	2	3	4	5	6	7	8	9	10	11	Total Votes Per Item
PENCILS				1	1	2	8	5	5	4	2	28
[illegible]		4	2	4	3	3		4	4	4		28
RULERS		1		1	3	4	8	1	6	1	1	26
ERASERS				3	4	1		7	4	5	4	28
CRAYONS		1	2	3	8	7		5	1		1	28
SCISSORS	2	3	3	7	4	1	3	3	1		1	28
[illegible]	7	7	2	3		3	1	1	2			26
PAPER	1		1			2	2	2	1	6	11	26
FOLDERS	4	7	8	4	2	1	1			1		28
PENS	4	2	4	3	6	2	3		2	1		27
[illegible]	11	4	2	1		1	2	1		5	2	29

Figure C4-3

Every child did not include all eleven items in his rating because the total votes vary from item to item. In order to compare ratings for the different items by using total scores, everyone must rate all eleven items. However, the children could discuss how much difference it would make if the total number of votes differed by one, two, or three votes. The children might also draw a slope diagram that would compare the ratios of total scores to number of children rating each job. They might find the average rating for each job by dividing the total score by the number of people voting.

To get the class thinking of other factors that determined price levels, I asked the children how they thought the price of movie tickets was determined. Responses included the theater owner and the film producer. We talked about how these people naturally wanted to make a sizable profit. What would happen if they set the price of one ticket at $26? The children immediately responded that no one could afford to go. I then asked what would happen if each ticket were only ten cents. The children readily agreed that for the consumer it would be a good deal, but for the movie theater owner and film producer this fee would hardly cover the expenses. The class soon realized that the consumer and producer indirectly agree on a fair price. The children also understood the principle that high demand inflated the price of an item.

With the above discussion in mind, the children returned to their original problem of setting prices for the items. The class recognized the need to determine the desirability of each item before setting prices. To obtain this rating, each child listed the eleven items in order of personal desirability with the most desirable item being number one and the least desirable item number eleven. The individual ratings were tallied on the board; the items were listed and beside these items, eleven columns were made for the various ratings. Figure C4-3 shows the totals of each of the positions. Upon examining the total chart, the children realized they could not rate the items because they had such varying opinions of which items were most and least desirable.

I told the children that perhaps we could weight each rating by giving it points, for example, assigning the most desirable item eleven points, the second most desirable item ten points, etc. By multiplying the points by the number of votes for each rating, the children could get a general average of all the opinions. The children thought this was a good idea. Some debate arose as to whether we should give one or eleven points to the most desirable item. The class reasoned that both ways would involve the same amount of work. Since they were divided in their opinion, the children decided to have half the class assign eleven points to the most desirable item while the other half would assign one point. In the end the class would compare the results. The children agreed that the results of both should be exactly opposite (i.e., the most desirable item would have the greatest total in one case and the least in the other).

Following several days of calculating the children arrived at the totals shown in Figure C4-4. As soon as the

Total Points For Each Item

Item	One point equals most desirable. Ordered from lowest to highest.	Eleven points equal most desirable. Ordered from highest to lowest.
Notebooks	90	222
Folders	91	245
Fines	119 (129)*	219
Pens	123	201
Scissors	136	200
Crayons	162	174
Drinks	171	164 (165)
Rulers	184	128
Pencils	224	112
Eraser	224	112
Paper	236	66 (76)

Figure C4-4

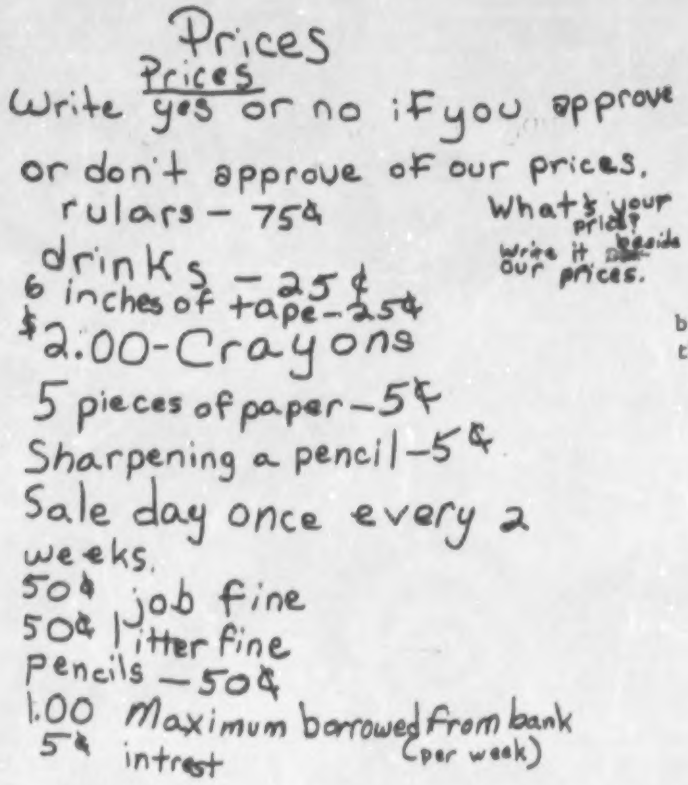
Numbers in parentheses indicate the correct number. The children's total was due to an error in arithmetic computation.

totals were listed on the board, the children immediately noted discrepancies. For example, notebooks received ninety points when one point equaled most desirable but did not receive the most points when eleven points equaled most desirable. The class spent several days looking for the errors. Finally someone noted that the total votes for each item were not the same, meaning that not everyone had included all eleven items in his ranking. Later, the class rerated the items making sure that all eleven items were included in the rating.

In order to assign a price for each item, the class decided to use the price of a drink of water as a basic price to determine other item prices. The class agreed that twenty-five cents for a drink was reasonable. The children felt that no one would use his total four-dollar allowance on drinks along because sixteen drinks per week would be a great amount for someone to buy. The children felt that eight drinks, or two dollars worth, was quite reasonable, thereby leaving two dollars for discretionary spending. Keeping in mind the two dollar discretionary spending money and the item's rating, the class agreed on the prices of items. Sample prices appear below.

Item	Price
pencils	$1.00
folders	$2.00
pens	$1.75
scissors	$1.50
paper	$ .05 per sheet

The 1972-73 class, following a similar item rating, appointed a committee to set the prices according to the item's degree of desirability. These prices were then submitted to the class for final approval. The survey shown in Figure C4-5 shows the committee's suggested prices. The returned surveys showed that all but two prices were satisfactory. The survey totals are shown below. The prices of tape and pencils were later lowered after a class discussion.



Prices

Prices

Write yes or no if you approve

or don't approve of our prices.

rulars - 75¢

drinks - 25¢

6 inches of tape - 25¢

$2.00 - Crayons

5 pieces of paper - 5¢

Sharpening a pencil - 5¢

Sale day once every 2 weeks.

50¢ job fine

50¢ litter fine

Pencils - 50¢

1.00 Maximum borrowed from bank

5¢ intrest (per week)

What's your price? Write it beside our prices.

Figure C4-5

Prices	Yes	No
rulers 75¢	19	1
sale, one every two weeks	16	4
drinks 25¢	10	10
5 sheets of paper 5¢	17	3
crayons $2.00	13	7
fines 50¢	17	3
6" tape 25¢	7	13
pencils 50¢	8	12

We next dealt with the problem of jobs. The children began by making a list of chores that needed to be done in the classroom. This list included the following jobs:

librarian
board keeper
art director
window keeper (regulate room temperature)
supply director (distribution of paper, books, etc.)
cleaners (reading corner, shelves, floor, wastebasket, coat closet, and chest of drawers)
card keeper (math cards)
lunch counter
attendance recorder
news director
banker
desk keeper (teacher's desk)

As the children thought about the specific responsibilities of each job, many could see an overlap in chores. The above list was pared as follows: the librarian was made responsible not only for the books but also for the math cards and would clean his own shelves; the job of window keeper was abolished; the news director position was combined with the art director since the news person's task had included maintaining the room bulletin board; the supply director was given the added task of keeping the chest of drawers (where paper is stored) neat; and the attendance person was thought to be able to take the lunch count as he noted absent and present classmates.

Suggestions for the amount of time a person should keep a job ranged from one week to forever. I reminded the children that since there were only eleven jobs a lot of people would not have the opportunity to work if people held the job forever. With that comment in mind the children voted on the duration of each job. The following list shows the results of their hand votes:

1 is hardest	VoTES, for Hardest Job										
	1	2	3	4	5	6	7	8	9	10	11
Librarian	16	3	1	2	3	0	1	1	0	0	0
Board	1	1	3	5	1	4	4	3	3	0	2
Art Director	0	1	10	3	3	1	2	0	3	1	2
Supply	1	1	4	2	5	2	4	2	0	2	4
Desk	0	0	1	3	3	9	2	2	6	2	0
Reading Corner	0	0	1	1	4	3	3	9	4	2	0
Floor	4	3	2	4	2	2	3	2	1	2	4
Waste basket	0	3	1	1	2	1	2	1	3	7	5
Coat closet	1	1	5	5	4	1	1	4	1	5	2
Lunch Att.	0	0	0	1	0	2	5	1	5	3	11
Banker	5	12	0	3	1	2	0	1	2	0	1

Figure C4-6

Two Weeks

librarian
boardkeeper
art director
supply director
reading corner cleaner
coat closet cleaner
attendance/lunch counter
Mr. Farias' desk

One Week

floor sweeper

Four Weeks

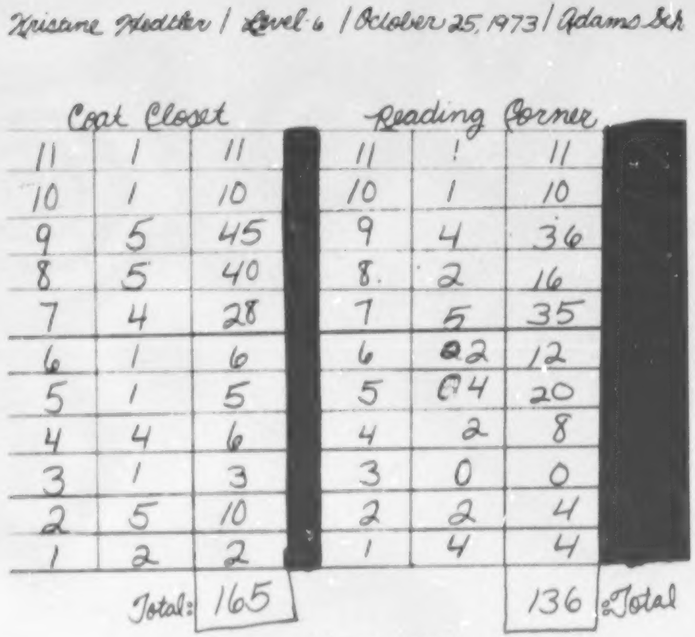
banker

Before fixing job salaries, the class rated the jobs to determine the level of job difficulty. The same process that was carried out with rating purchasable items was again used. Job difficulty was defined as the amount of time it took to do the job, the difficulty of the tasks involved, and the relative importance of the job in the classroom. Figure C4-6 shows the total votes for each rating. Again, to find the average class rating, the ratings were weighted (given points) and a total score obtained for each job. The children decided it would be fun to assign the most points (eleven) to the hardest (first) job. This time they did not wish to reverse the process of assigning the hardest job the least points. Figure C4-7 shows one child's calculations for two jobs.

During the course of their computations, several children noted that not everyone had included all eleven jobs in his rating (see Figure C4-6). The total votes for each job varied from twenty-six (art director) to thirty (coat closet). The class rechecked the individual surveys but could not find the mistakes. The children decided they had done the best they could and therefore accepted these results.

Job salaries were assigned according to their level of difficulty based on the rating survey, the most difficult job receiving the highest salary. After a few weeks, however, some jobs were so unglamorous that despite their already high salaries, they were not being done. The salaries were then raised. Conversely, when a job was deemed too easy, the salary was lowered.

Many interesting suggestions were made to assign jobs. Using the alphabetical class list was voted down because it was thought not to be random enough. Throwing a die and pulling names from a hat received consideration, and the latter method was picked. The children in the 1972-73 class chose to put into the hat only the names of those who were interested in a particular job. The name that was drawn got



Kristine Hedtke / Level 6 / October 25, 1973 / Adams Sch

Coat Closet			Reading Corner		
11	1	11	11	1	11
10	1	10	10	1	10
9	5	45	9	4	36
8	5	40	8.	2	16
7	4	28	7	5	35
6	1	6	6	2	12
5	1	5	5	4	20
4	4	6	4	2	8
3	1	3	3	0	0
2	5	10	2	2	4
1	2	2	1	4	4
	Total:	165			136 :Total

Figure C4-7

The children might scan the results and try to spot obvious errors. For example, four votes for a rating in the middle of the list must have a total of more than six (it should in fact be sixteen). The correct totals for the columns are 176 and 156, respectively.

the job. The following year's class chose to put into the hat the names of all the children in the class. As a name was drawn, that person could choose the particular job he/she wanted.

A new position was created after the 1973-74 miniature economy had been operating for a few weeks. Up to that point the children had unanimously agreed that I should be the one to judge whether a job was done well. I questioned the children's complete faith in my judgment. They were not even curious to know what criteria I used to judge. Finally they also agreed that it was difficult not only for me but also for them to remember whether they had even done their job on a given day. The position of supervisor was therefore instated. His/her responsibility was to determine whether other jobs were done daily and to indicate this by marking a chart.

In the 1972-73 class the problem of an absent job holder arose. The class voted on the question of whether to grant full pay (sick pay) even though the person might not have done his job daily. The vote revealed that the class felt that full pay was justifiable. To cover an absent person's job, an extra worker's position was created. This person received a base pay of twenty-five cents (in case no one got sick) plus one-fifth of the wage of whoever was absent.

D. References

1. LIST OF "HOW TO" CARDS

Below are listed the current "How To" Card titles that students working on the Classroom Management challenge might find useful. A complete listing of both the "How To" Cards and the Design Lab "How To" Cards is contained in the USMES Guide. In addition, the Design Lab Manual contains the list of Design Lab "How To" Cards.

GRAPHING

GR 1 - How to Make a Bar Graph Picture of Your Data
GR 2 - How to Show the Differences in Many Measurements or Counts of the Same Thing by Making a Histogram
GR 3 - How to Make a Line Graph Picture of Your Data
GR 4 - How to Decide Whether to Make a Bar Graph Picture or a Line Graph Picture of Your Data
GR 5 - How to Find Out If There Is Any Relationship between Two Things by Making a Scatter Graph
GR 6 - How to Make Predictions by Using a Scatter Graph
GR 7 - How to Show Several Sets of Data on One Graph

MEASUREMENT

M 1 - How to Use a Stopwatch
M 2 - How to Measure Distances
M 9 - How to Make a Conversion Graph to Use in Changing Measurements from One Unit to Another Unit
M 10 - How to Use a Conversion Graph to Change *Any* Measurement in One Unit to Another Unit

PROBABILITY AND STATISTICS

PS 2 - How to Record Data by Tallying
PS 3 - How to Describe Your Set of Data by Finding the Average
PS 4 - How to Describe Your Set of Data by Using the Middle Piece (Median)
PS 5 - How to Find the Median of a Set of Data from a Histogram

RATIOS, PROPORTIONS, AND SCALING

R 1 - How to Compare Fractions or Ratios by Making a Triangle Diagram
R 2 - How to Make a Drawing to Scale
R 3 - How to Make Scale Drawings Bigger or Smaller

New titles to be added:

How to Make a Q-Q Graph
How to Measure Light Intensity
How to Measure Sound Intensity
How to Find the Interquartile Range
How to Round Off Data
How to Design an Experiment
How to Make an Opinion Survey
How to Choose a Sample

A cartoon-style set of "How To" Cards for primary grades is being developed from the present complete set. In most cases titles are different and contents have been rearranged among the various titles. It is planned that this additional set will be available in 1977.

2. LIST OF BACKGROUND PAPERS

As students work on USMES challenges, teachers may need background information that is not readily accessible elsewhere. The Background Papers fulfill this need and often include descriptions of activities and investigations that students might carry out.

Below are listed titles of current Background Papers that teachers may find pertinent to Classroom Management. The papers are grouped in the categories shown, but in some cases the categories overlap. For example, some papers about graphing also deal with probability and statistics.

The Background Papers are being revised, reorganized, and rewritten. As a result, many of the titles will change.

DESIGN PROBLEMS	*DP13 People and Space* by Gorman Gilbert
GRAPHING	*GR 3 Using Graphs to Understand Data* by Earle Lomon *GR 4 Representing Several Sets of Data on One Graph* by Betty Beck *GR 6 Using Scatter Graphs to Spot Trends* by Earle Lomon *GR 7 Data Gathering and Generating Graphs at the Same Time (or Stack 'Em and Graph 'Em at One Fell Swoop!)* by Edward Liddle
GROUP DYNAMICS	*GD 2 A Voting Procedure Comparison That May Arise in USMES Activities* by Earle Lomon
MEASUREMENT	*M 3 Determining the Best Instrument to Use for a Certain Measurement* by USMES Staff
PROBABILITY AND STATISTICS	*PS 1 Collecting Data in Sets or Samples* by USMES Staff *PS 4 Design of Surveys and Samples* by Susan Devlin and Anne Freeny *PS 5 Examining One and Two Sets of Data Part I: A General Strategy and One-Sample Methods* by Lorraine Denby and James Landwehr *PS 6 Examining One and Two Sets of Data Part II: A Graphical Method for Comparing Two Samples* by Lorraine Denby and James Landwehr

RATIOS, PROPORTIONS, AND SCALING

R 1 Graphic Comparison of Fractions by Merrill Goldberg
R 2 Geometric Comparison of Ratios by Earle Lomon
R 3 Making and Using a Scale Drawing by Earle Lomon

3. BIBLIOGRAPHY OF NON-USMES MATERIALS

The following materials are references that may be of some use during work on Classroom Management. The teacher is advised to check directly with the publisher regarding current prices. A list of references on general mathematics and science topics can be found in the USMES Guide.

Books for Teachers

Biggs, Edith E. and MacLean, James R. *Freedom to Learn.* Ontario, Canada: Addison-Wesley (Canada) Ltd., 1969 pages 29-52.
Excellent resource book for teachers. Chapter 3 deals with classroom needs ranging from physical to equipment. A limited number of designs for storage boxes are included.

Early Childhood Education Study. *Building with Tubes, Building with Cardboard.* Newton, Massachusetts: Education Development Center, 1970.
Two pamphlets which contain useful ideas and helpful hints for working with cardboard materials.

Engel, Brenda S. *Arranging the Informal Classroom.* Newton, Massachusetts: Education Development Center, 1973.
The various interest areas that make up an open classroom are described in this paperback book; ideas, suggestions and instructions are included in addition to a bibliography worth reading.

Farallones Designs. *Farallones Scrapbook.* Point Reyes Station, California 94956
An excellent resource book for teachers. Two chapters, in particular, are applicable to the unit: "Ways to Change Classrooms" and "Trash Can Do It".

Wastnedge, E. R. (editor). *Nuffield Junior Science, Teacher's Guide 1.* New York, New York: Agathon Press, Inc., 1967, pages 152-216.
Contains an excellent chapter on classroom organization: arrangement, materials, storage, display space.

4. GLOSSARY

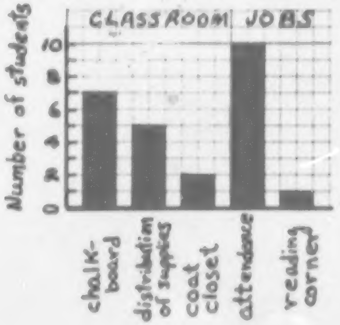
The following definitions may be helpful to a teacher whose class is investigating a Classroom Management challenge. Some of the words are included to give the teacher an understanding of technical terms; others are included because they are commonly used throughout the resource book.

These terms may be used when they are appropriate for the children's work. For example, a teacher may tell the children that when they conduct surveys, they are collecting *data*. It is not necessary for the teacher or students to learn the definitions nor to use all of these terms while working on their challenge. Rather, the children will begin to use the words and understand the meanings as they become involved in their investigations.

Audio	Relating to the transmission, reception, or reproduction of sound.
Audiometer	An instrument for measuring hearing ability.
Average	The numerical value obtained by dividing the sum of the elements of a set of data by the number of elements in that set. Also called the mean.
Bias	A deviation in the expected values of a set of data, often occurring when some factor produces one outcome more frequently than others.
Comparative Shopping	A method for determining the best buy(s) by comparing the costs, quantities, and qualities of different brands of products. For example comparing building materials for shelves and cupboards.
Conversion	A change from one form to another. Generally associated in mathematics and science with the change from one unit of measure to another or the change from one form of energy to another.
Correlation	A relationship between two sets of data.
Cost	The amount of money needed to produce or to purchase goods or services.
Data	Any facts, quantitative information, or statistics.

Decibel	A unit of measurement of sound intensity. The number of decibels is equal to ten times the logarithm of the ratio of the sound intensity and a standard reference point. The reference point is the power required to produce a barely audible sound at a frequency of 1000 Hertz (i.e., a pitch nearly two octaves above middle C).
Degree	A unit of measurement of temperature or angle.
Distribution	The spread of data over the range of possible results.
Division of Labor	The process by which a complicated task is reduced to a series of simple tasks. Each task is normally performed repetitively by the same worker.
Economics	A social science concerned chiefly with description and analysis of the production, distribution, and consumption of goods and services.
Event	A happening; an occurrence; something that takes place. Example: a violation of a rule.
Foot-Candle	A unit of measurement of illuminating. A surface placed one foot from a light source having a light intensity of one candle has an illumination of one foot-candle.
Force	A push or a pull.
Frequency	The number of times a certain event occurs in a given unit of time or in a given total number of events.
Graph	A drawing or a picture of one or several sets of data.
Bar Graph	A graph of a set of measures or counts whose sizes are represented by the vertical (or horizontal) lengths of bars of equal widths or lines. Example: number of students who wish various classroom jobs.

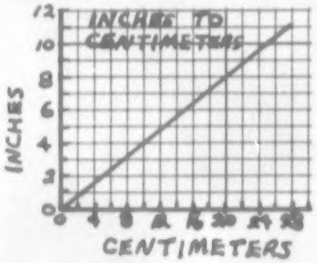
Classroom Job	Number of Students
Chalkboard	7
Distribution of supplies	5
Coat closet	2
Attendance	10
Reading Corner	1



Conversion Graph

A line graph that is used to change one unit of measurement to another. For example: converting inches to centimeters.

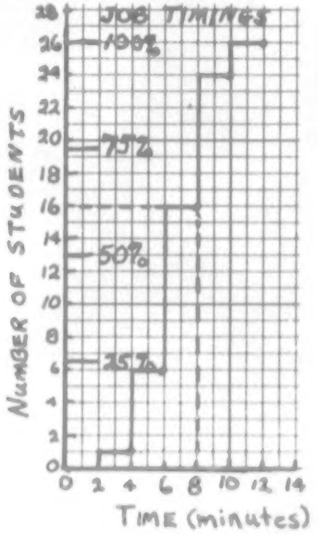
Inches	Centimeters
0	0
1	2.54
10	25.4



Cumulative Distribution Graph

A graph that can be constructed from a histogram by computing running totals from the histogram data. The first running total is the first value in the histogram data (see table of values). The second running total is the sum of the first and second values of the histogram, the third is the sum of the first, second, and third values, and so on. The horizontal scale on the graph is similar to that of the histogram; the vertical scale goes from 0 to the total number of events observed or samples taken (in the example, the total number of students who took a given time or less to do a job). Each vertical distance on the graph shows the running total for the value shown on the horizontal scale; thus the graph below indicates that sixteen students (or about 61%) did the job in eight minutes or less.

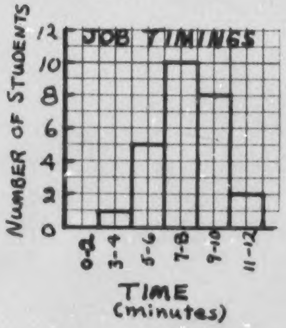
TIME (minutes)	NUMBER OF STUDENTS
2 or fewer	0
4 " "	1
6 " "	6
8 " "	16
10 " "	24
12 " "	26



Histogram

A type of bar graph that shows the distribution of the number of times that different measure or counts of the same event have occurred. A histogram always shows numerical data on the horizontal axis. Example: the amount of time it takes students to do a classroom job.

TIME (minutes)	NUMBER OF STUDENTS
0-2	0
3-4	1
5-6	5
7-8	10
9-10	8
11-12	2

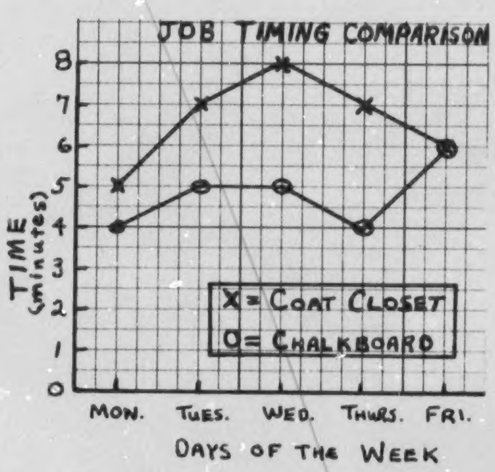


Line Chart

A bar graph that is represented by circles, triangles, or crosses with lines connecting them so that it has the appearance of a line graph. (See *Line Graph.*) This is a useful representation when two or more sets of data are shown on the same graph. Example: comparing two job timings over one week's time.

DAY OF THE

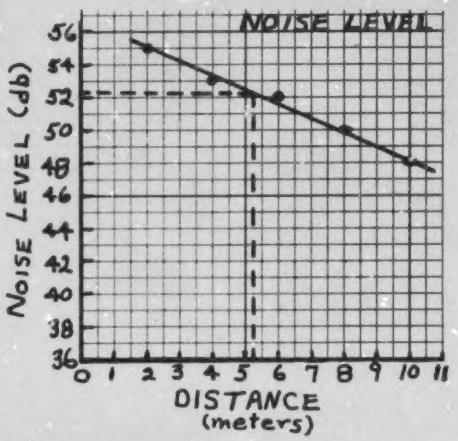
DAY OF THE WEEK	TIMES (min.) COAT CLOSET	 CHALKBOARD
MON.	5	4
TUES.	7	5
WED.	8	5
THURS.	7	4
FRI.	6	6



Line Graph

A graph in which a smooth line or line segments pass through or near points representing members of a set of data. Since the line represents an infinity of points, the variable on the horizontal axis must be continuous. If the spaces between the markings on the horizontal axis have no meaning, then the graph is not a line graph, but a line chart (see *Line Chart*). Example: the noise level in the room at various distances from the noise source. (This is a line graph since you can tell from the graph that the noise level was about 52.5 decibels at 5.25 meters away from the noise source even though the noise level was not measured at that distance.)

DISTANCE (meters)	NOISE LEVEL (db)
2	55
4	53
6	52
8	50
10	48

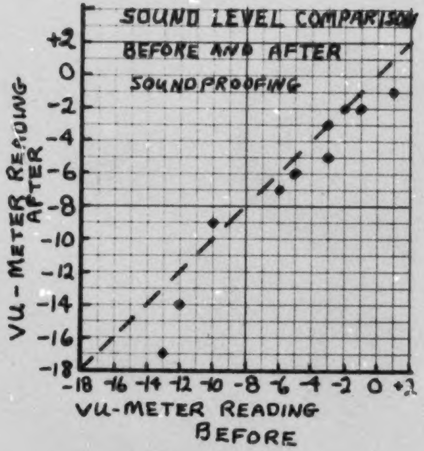


Q-Q Graph

A graph that shows the comparison between the same type of data collected from two groups of people or from two different situations. Example: sound level readings (take with a VU-meter on a tape recorder) before and after insulating a classroom wall. The data for each set is ordered and the smallest measurement of one set plotted against the smallest of the other set, the second smallest against the second smallest, etc. The scatter of points is compared to a reference line, a dashed 45° line that represents data from two identical sets.

VU-METER READINGS

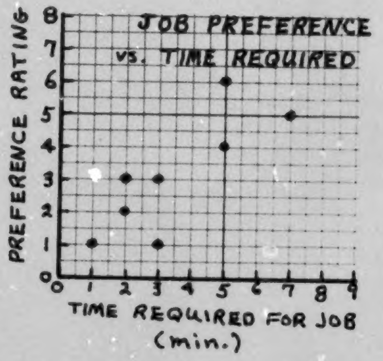
BEFORE SOUNDPROOFING	AFTER SOUNDPROOFING
-13	-17
-12	-14
-10	-9
-6	-7
-5	-6
-3	-5
-3	-3
-2	-2
-1	-2
+1	-1



Scatter Graph

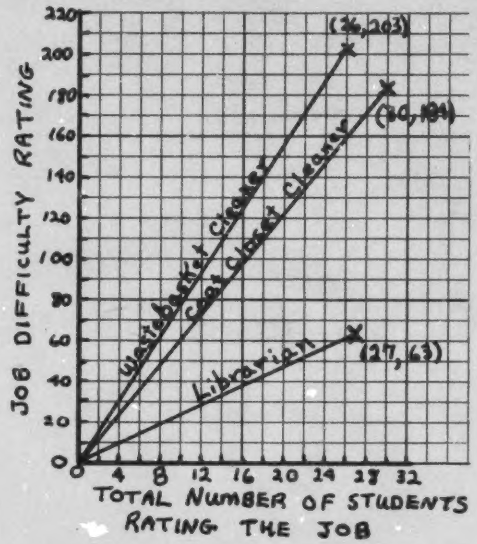
A graph showing a scatter of points, each of which represents two characteristics of the same thing. For example, in the graph below, each point represents the amount of time to do a job and its preference rating.

PREFERENCE RATING OF JOB (1 = MOST PREFERRED)	TIME REQUIRED TO DO JOB (minutes)
1	1
1	3
2	2
3	2
3	3
4	5
5	7
6	5



*Slope Diagram**	A graphical means of comparing fractions or ratios. To represent the ratio a/b, plot the point (b,a) and draw a line from (b,a) to the origin, (0,0). The slope of this line represents the ratio a/b. By comparing slopes of different lines, different ratios can be compared; the steeper the line the larger the ratio. For example, in the graph below showing the ratio of scores results from a job difficulty rating to total number of students who rated each job, the ratio (or percentage) of students who thought cleaning the wastebaskets was hard is larger than the ratio (or percentages) for the other two jobs.

JOB	JOB DIFFICULTY RATING	NUMBER OF STUDENTS RATING EACH JOB
Coat Closet Cleaner	184	30
Wastebasket Cleaner	203	26
Librarian	63	27



Histogram	See *Graph*.
Hypothesis	A tentative conclusion made in order to test its implications or consequences.
Illumination (Illuminance)	A measure of how well-lit a surface is. More technically, a measure of how much light energy falls upon a given area in a given time. Measured in foot-candles.
Inference	An assumption derived from facts or information considered to be valid and accurate.

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*Formerly called Triangle Diagram

Light Intensity (Luminous Intensity)	A measure of brightness of a source of light. More technically, a measure of how much light energy is given off by a source in a given time per unit solid angle. Measured in candles for a point source; in candles/cm^2 for an extended (or a surface) source.
Mean	See *Average*.
Median	The middle value of a set of data in which the elements have been ordered from smallest to largest. The median value has as many elements above it as below it.
Mode	The element or elements in a set of data that occur most often.
Ordered Set	A set of data arranged from smallest to largest.
Per Cent	Literally per hundred. A ratio in which the denominator is always 100, e.g., 72 per cent = 72/100 = 0.72 = 72% , where the symbol % represents 1/100.
Percentage	A part of a whole expressed in hundredths.
Population	Any group of objects (e.g., people, animals, items) or events from which samples are taken for statistical measurement.
Probability	The likelihood or chance (expressed numerically) of one event occurring out of several possible events.
Proportion	A statement of equality of two ratios, i.e., the first term divided by the second term equals the third term divided by the fourth term, e.g., 5/10 = 1/2. Also a synonym for ratio: when two quantities are in direct proportion, their ratios are the same.
Quartile	
First	The first quartile is the value of the quarter-way piece of data in an ordered set of data.
Third	The third quartile is the value of the three-quarter-way piece of data in an ordered set of data.
Interquartile Range	The range or length of the middle 50% of an ordered set of data; the difference between the first and third quartile.

Range	The difference between the smallest and the largest values in a set of data.
Rank	To order the members of a set according to some criterion, such as size or importance. Example: to put pieces of data from smallest to largest.
Ratio	The quotient of two denominate numbers or values indicating the relationship in quantity, size, or amount between two different things. For example, the ratio of the number of students in the class compared to the number of available jobs.
Retail Price	The price level of goods sold in small quantity to the consumer.
Sample	A representative fraction of a population studied to gain information about the whole population.
Sample Size	The number of elements in a sample.
Scale	A direct proportion between two sets of dimensions (as between the dimensions of the classroom and a scaled diagram of the room).
Scale Drawing	A drawing whose dimensions are in direct proportion to the object drawn.
Scale Map	A map whose dimensions are in direct proportion to the dimensions of the area represented.
Scale Model	A three-dimensional representation constructed to scale.
Set	A collection of characteristics, persons, or objects. Each thing in a set is called a member or an element.
Set Theory	The branch of mathematics that deals with the nature and relations of sets.
Complement of a Set	The set of all elements in the universal set but not in the given set. For example, if the universal set is the set of all students in a class, then the set of girls is the complement of the set of boys.

Intersection of Sets	The set of elements common to two or more sets. For example, if set A is all the easy tasks and set B is all the tasks that take little time to do, the intersection of set A and set B is the set of easy tasks that take little time to do.
Universal Set	A set that contains all elements relevant to a particular problem.
Venn Diagram	A drawing used to illustrate the relationship between sets.
Slope Diagram	See *Graph*.
Sound Intensity	Level or loudness of a sound. A measure of how much sound energy flows through a given area in a given time. Measured in decibels or watts/cm^2.
Sound Level Meter	An instrument used to measure sound intensity. Also called VU-meter.
Statistics	The science of drawing conclusions or making predictions using a collection of quantitative data.
Tally	A visible record used to keep a count of some set of data, especially a record of the number of times one or more events occur. Example: tallying opinion survey data.
Whole Price	The price level of goods sold in large quantity to a merchant for resale.

E. Skills, Processes, and Areas of Study Utilized in Classroom Management

The unique aspect of USMES is the degree to which it provides experience in the process of solving real problems. Many would agree that this aspect of learning is so important as to deserve a regular place in the school program even if it means decreasing to some extent the time spent in other important areas. Fortunately, real problem solving is also an effective way of learning many of the skills, processes, and concepts in a wide range of school subjects.

On the following pages are five charts and an extensive, illustrative list of skills, processes, and areas of study that are utilized in USMES. The charts rate Classroom Management according to its potential for learning in various categories of each of five subject areas--real problem solving, mathematics, science, social science, and language arts. The rating system is based on the amount that each skill, process, or area of study within the subject areas is used--extensive (1), moderate (2), some (3), little or no use (-). (The USMES Guide contains a chart that rates all USMES units in a similar way.)

The chart for real problem solving presents the many aspects of the problem-solving process that students generally use while working on an USMES challenge. A number of the steps in the process are used many times and in different orders, and many of the steps can be performed concurrently by separate groups of students. Each aspect listed in the chart applies not only to the major problem stated in the unit challenge but also to many of the tasks each small group undertakes while working on a solution to the major problem. Consequently, USMES students gain extensive experience with the problem-solving process.

The charts for mathematics, science, social science, and language arts identify the specific skills, processes, and areas of study that may be learned by students as they respond to a Classroom Management challenge and become involved with certain activities. Because the students initiate the activities, it is impossible to state unequivocally which activities will take place. It is possible, however, to document activities that have taken place in USMES classes and identify those skills and processes that have been used by the students.

Knowing in advance which skills and processes are likely to be utilized in Classroom Management and knowing the extent that they will be used, teachers can postpone the teaching of those skills in the traditional manner until later in the year. If the students have not learned them during their USMES activities by that time, they can study them in the usual way. Further, the charts enable a teacher to integrate USMES more readily with other areas of classroom work. For example, teachers may teach fractions during math period when fractions are also being learned and utilized in the students' USMES activities. Teachers who have used USMES for several successive years have found that students are more motivated to learn basic skills when they have determined a need for them in their USMES activities. During an USMES session the teacher may allow the students to learn the skills entirely on their own or from other students, or the teacher may conduct a skill session as the need for a particular skill arises.

Because different USMES units have differing emphases on the various aspects of problem solving and varying amounts of possible work in the various subject areas, teachers each year might select several possible challenges, based on their students' previous work in USMES, for their class to consider. This choice should provide students with as extensive a range of problems and as wide a variety of skills, processes, and areas of study as possible during their years in school. The charts and lists on the following pages can also help teachers with this type of planning.

Some USMES teachers have used a chart similar to the one given here for real problem solving as a record-keeping tool, noting each child's exposure to the various aspects of the process. Such a chart might be kept current by succeeding teachers and passed on as part of a student's permanent record. Each year some attempt could be made to vary a student's learning not only by introducing different types of challenges but also by altering the specific activities in which each student takes part. For example, children who have done mostly construction work in one unit may be encouraged to take part in the data collection and data analysis in their next unit.

Following the rating charts are the lists of explicit examples of real problem solving and other subject area skills, processes, and areas of study learned and utilized in Classroom Management. Like the charts, these lists are based on documentation of activities that have taken place in USMES classes. The greater detail of the lists allows teachers to see exactly how the various basic skills, processes, and areas of study listed in the charts may arise in Classroom Management.

The number of examples in the real problem solving list have been limited because the list itself would be unreasonably long if all the examples were listed for some of the categories. It should also be noted that the example(s) in the first category--*Identifying and Defining Problems*--have been limited to the major problem that is the focus of the unit. During the course of their work, the students will encounter and solve many other secondary problems, such as the problem of how to display their data or how to draw a scale layout.

Breaking down an interdisciplinary curriculum like USMES into its various subject area components is a difficult and highly inexact procedure. Within USMES the various subject areas overlap significantly, and any subdivision must be to some extent arbitrary. For example, where does measuring as a mathematical skill end and measurement as science and social science process begin? How does one distinguish between the processes of real problem solving, of science and of social science? Even within one subject area, the problem still remains--what is the difference between graphing as a skill and graphing as an area of study? This problem has been partially solved by judicious choice of examples and extensive cross-referencing.

Because of this overlap of subject areas, there are clearly other outlines that are equally valid. The scheme presented here was developed with much care and thought by members of the USMES staff with help from others knowledgeable in the fields of mathematics, science, social science, and language arts. It represents one method of examining comprehensively the scope of USMES and in no way denies the existence of other methods.

REAL PROBLEM SOLVING	Overall Rating
Identifying and defining problem.	1
Deciding on information and investigations needed.	1
Determining what needs to be done first, setting priorities.	1
Deciding on best ways to obtain information needed.	1
Working cooperatively in groups on tasks.	1
Making decisions as needed.	1
Utilizing and appreciating basic skills and processes.	1
Carrying out data collection procedures--observing, surveying, researching, measuring, classifying, experimenting, constructing.	1
Asking questions, inferring.	1
Distinguishing fact from opinion, relevant from irrelevant data, reliable from unreliable sources.	1

REAL PROBLEM SOLVING	Overall Rating
Evaluating procedures used for data collection and analysis. Detecting flaws in process or errors in data.	1
Organizing and processing data or information.	1
Analyzing and interpreting data or information.	1
Predicting, formulating hypotheses, suggesting possible solutions based on data collected.	1
Evaluating proposed solutions in terms of practicality, social values, efficacy, aesthetic values.	1
Trying out various solutions and evaluating the results, testing hypotheses.	1
Communicating and displaying data or information.	1
Working to implement solution(s) chosen by the class.	1
Making generalizations that might hold true under similar circumstances; applying problem-solving process to other real problems.	1

KEY: 1 = extensive use, 2 = moderate use, 3 = some use, - = little or no use

MATHEMATICS	Overall Rating
Basic Skills	
Classifying/Categorizing	3
Counting	1
Computation Using Operations	
Addition/Subtraction	2
Multiplication/Division	2
Fractions/Ratios/Percentages	2
Business and Consumer Mathematics/ Money and Finance	2
Measuring	2
Comparing	3
Estimating/Approximating/Rounding Off	2
Organizing Data	1
Statistical Analysis	3
Opinion Surveys/Sampling Techniques	2
Graphing	2
Spatial Visualization/Geometry	3
Areas of Study	
Numeration Systems	2
Number Systems and Properties	2
Denominate Numbers/Dimensions	2
Scaling	-
Symmetry/Similarity/Congruence	-
Accuracy/Measurement Error/ Estimation/Approximation	2
Statistics/Random Processes/Probability	3
Graphing/Functions	2
Fraction/Ratio	2
Maximum and Minimum Values	-
Equivalence/Inequality/Equations	3
Money/Finance	2
Set Theory	-

SCIENCE	Overall Rating
Processes	
Observing/Describing	1
Classifying	3
Identifying Variables	3
Defining Variables Operationally	3
Manipulating, Controlling Variables/ Experimenting	3
Designing and Constructing Measuring Devices and Equipment	2
Inferring/Predicting/Formulating, Testing Hypotheses/Modeling	1
Measuring/Collecting, Recording Data	1
Organizing, Processing Data	1
Analyzing, Interpreting Data	1
Communicating, Displaying Data	1
Generalizing/Applying Process to New Problems	1
Areas of Study	
Measurement	2
Motion	-
Force	-
Mechanical Work and Energy	-
Solids, Liquids, and Gases	-
Electricity	-
Heat	-
Light	-
Sound	-
Animal and Plant Classification	-
Ecology/Environment	-
Nutrition/Growth	-
Genetics/Heredity/Propagation	-
Animal and Plant Behavior	-
Anatomy/Physiology	-

KEY: 1 = extensive use, 2 = moderate use, 3 = some use, - = little or no use

SOCIAL SCIENCE	Overall Rating
Process	
Observing/Describing/Classifying	1
Identifying Problems, Variables	1
Manipulating, Controlling Variables/ Experimenting	2
Inferring/Predicting/Formulating, Testing Hypotheses	1
Collecting, Recording Data/Measuring	1
Organizing, Processing Data	1
Analyzing, Interpreting Data	1
Communicating, Displaying Data	1
Generalizing/Applying Process to Daily Life	1
Attitudes/Values	
Accepting responsibility for actions and results	1
Developing interest and involvement in human affairs	1
Recognizing the importance of individual and group contributions to society	1
Developing inquisitiveness, self-reliance, and initiative	1
Recognizing the values of cooperation, group work, and division of labor	1
Understanding modes of inquiry used in the sciences, appreciating their power and precision	1
Respecting the views, thoughts, and feelings of others	1
Being open to new ideas and information	1
Learning the importance and influence of values in decision making	1
Areas of Study	
Anthropology	-
Economics	-
Geography/Physical Environment	-
Political Science/Government Systems	1
Recent Local History	3
Social Psychology/Individual and Group Behavior	1
Sociology/Social Systems	1

LANGUAGE ARTS	Overall Rating
Basic Skills	
Reading	
Literal Comprehension: Decoding Words, Sentences, Paragraphs	2
Critical Reading: Comprehending Meanings, Interpretation	2
Oral Language	
Speaking	1
Listening	1
Memorizing	-
Written Language	
Spelling	3
Grammar: Punctuation, Syntax, Usage	3
Composition	3
Study Skills	
Outlining/Organizing	3
Using References and Resources	3
Attitudes/Values	
Appreciating the value of expressing ideas through speaking and writing	1
Appreciating the value of written resources	3
Developing an interest in reading and writing	3
Making judgments concerning what is read	2
Appreciating the value of different forms of writing, different forms of communication	1

KEY: 1 = extensive use, 2 = moderate use,
3 = some use, - = little or no use

REAL PROBLEM SOLVING IN CLASSROOM MANAGEMENT

Identifying and Defining Problems	• Students agree that the classroom needs to be neat and organized in order for them to function smoothly in it. They determine that setting up classroom jobs for everyone would help achieve this goal. • See also SOCIAL SCIENCE list: *Identifying Problems, Variables.*
Deciding on Information and Investigations Needed	• Students decide that they need to determine what the present classroom jobs are and what new jobs are needed. They also decide that they need to collect data on these jobs, such as amount of time to do a job, frequency the job must be done, and student satisfaction in doing the job. • Students determine the need to investigate various ways to distribute jobs fairly. • Students decide to investigate ways to remind and encourage students to do their jobs.
Determining What Needs to Be Done First, Setting Priorities	• Students decide first to collect information on the present job situation and classroom routines before investigating new jobs to improve classroom organization. • Students decide to write job descriptions before distributing the jobs.
Deciding on Best Ways to Obtain Information Needed	• Students decide that observation is the best way to determine present classroom jobs and routines. • Students agree that an opinion survey is the best way to determine student feelings towards each job. • Students agree that a stopwatch would measure accurately the amount of time to perform a job.
Working Cooperatively in Groups on Tasks	• Students work in small groups to gather information about job requirements, to write job descriptions, to conduct opinion surveys and to design a fair method for distributing the jobs.
Making Decisions as Needed	• Students decide to work in small groups so that more work can be accomplished. • Students decide upon the best way to administer an opinion survey.

Making Decisions as Needed (cont.)

- Students decide to represent their opinion survey data on graphs.
- Students decide upon the best way to rank the jobs in terms of difficulty to do and their desirability.
- Students decide upon a fair way to distribute the jobs.
- Students decide upon a way to remind and encourage students to do their jobs.
- Students decide how to judge whether a job was done well and who should do the judging.

Utilizing and Appreciating Basic Skills and Processes

- Students use a bar graph to interpret their opinion survey data.
- Students use a stopwatch to measure the amount of time it takes a student to do a job each day.
- Students determine the average time it takes each student to do a job for one week.
- Students observe that students use a different criteria to judge whether a job is difficult to do.
- Students write job descriptions.
- See also MATHEMATICS, SCIENCE, SOCIAL SCIENCE, and LANGUAGE ARTS lists.

Carrying Out Data Collection Procedures--Opinion Surveying, Researching, Measuring, Classifying, Experimenting, Constructing

- Students conduct an opinion survey to find out how students feel about various jobs.
- Students tally the results from the opinion survey on a graph.
- Students measure with a stopwatch the amount of time it takes a student to do a job.
- Students experiment with different ways to distribute jobs fairly, such as using a spinner device or pulling names from a container; they tally the number of times the different numbers or names are chosen.
- Students experiment with different ways to remind students to do their jobs; they try out different ways and check off completed jobs on a chart.
- Students construct a spinner device to help distribute jobs and a chart on which to check off completed jobs.
- See also MATHEMATICS list: *Classifying/Categorizing; Measuring.*
- See also SCIENCE list: *Observing/Describing; Classifying; Manipulating, Controlling Variables/Experimenting; Designing and Constructing Measuring Devices and Equipment; Measuring/Collecting, Recording Data.*

Carrying Out Data Collection Procedures--Opinion Surveying, Researching, Measuring, Classifying, Experimenting, Constructing (cont.)	• See also SOCIAL SCIENCE list: *Observing/Describing/Classifying; Manipulating, Controlling Variables/Experimenting, Collecting, Recording Data/Measuring.*
Asking Questions, Inferring	• Students question whether present classroom arrangement of jobs is satisfactory. They infer from observation that it is not. • Students question which jobs are more popular and infer from the job ratings on opinion surveys that there are several. • Students question what is a fair way to distribute jobs. They decide that a fair way is when everyone has an equal chance of being chosen and infer from their data that one method is fairer than the other. • See also SCIENCE list: *Inferring/Predicting/Formulating, Testing Hypotheses/Modeling.* • See also SOCIAL SCIENCE list: *Inferring/Predicting/Formulating, Testing Hypotheses.*
Distinguishing Fact from Opinion, Relevant from Irrelevant Data, Reliable from Unreliable Sources	• Students distinguish between qualitative data gathered from an opinion survey and quantitative data gathered from observation (timing with a stopwatch).
Evaluating Procedures Used for Data Collection and Analysis, Detecting Flaws in Process or Errors in Data	• Students evaluate the procedure used by students to time how long it takes students to do a job. • Students evaluate the different criteria used by different people who judge whether a job is done well or not. • Students evaluate distribution procedures for fairness. • See also MATHEMATICS list: *Estimating/Approximating/Rounding Off.*
Organizing and Processing Data	• Students record timing data on a chart. • Students compile results of their opinion survey. • Students compile results of their data from each distribution method (spinner, picking names from a container) to determine fairness. • Students tally on charts the number of times a job is and is not done when different ways of reminding students are used. • See also MATHEMATICS list: *Organizing Data.* • See also SCIENCE and SOCIAL SCIENCE lists: *Organizing, Processing Data.*

Analyzing and Interpreting Data

- Students compute average time it takes to do each job.
- Students make a bar graph of their opinion survey data.
- Students make histograms of data collected by using the spinner and picking names from a container.
- Students list jobs in order of difficulty based on opinion survey results.
- Students determine the total number of jobs done when different ways of reminding students are tried.
- See also MATHEMATICS list: *Comparing; Statistical Analysis; Opinion Surveys/Sampling Techniques; Graphing; Maximum and Minimum Values.*
- See also SCIENCE and SOCIAL SCIENCE lists: *Analyzing, Interpreting Data.*

Predicting, Formulating Hypotheses, Suggesting Possible Solution Based on Data Collected

- Students hypothesize that some jobs are more popular than others.
- Students hypothesize that students will remember to do their jobs if there is a chart within easy view that reminds them.
- Students suggest that several new jobs be added, that the jobs be grouped according to times needed to complete jobs, and that jobs be distributed by using a fair method.
- See also SCIENCE list: *Inferring/Predicting/Formulating, Testing Hypotheses/Modeling.*
- See also SOCIAL SCIENCE list: *Inferring/Predicting/Formulating, Testing Hypotheses.*

Evaluating Proposed Solutions in Terms of Practicality, Social Values, Efficacy, Aesthetic Values

- Every two weeks students evaluate whether the classroom is well organized and evaluate the method of distributing jobs, the method for encouraging students to do their jobs, and the method for judging whether a job is well done.

Trying Out Various Solutions and Evaluating the Results, Testing Hypotheses

- Students try several ways of distributing jobs (e.g., using a spinner or pulling names from a container) and evaluate each way in terms of fairness by tallying the number of times each name gets chosen.
- Students try different ways of reminding students to do their jobs and check off completed jobs on a chart.
- See also SCIENCE list: *Inferring/Predicting/Formulating, Testing Hypotheses/Modeling.*
- See also SOCIAL SCIENCE list: *Inferring/Predicting/Formulating, Testing Hypotheses.*

Communicating and Displaying Data or Information	• Students represent the results of their opinion survey on a bar graph and represent results of spins of spinner and drawing names from a container on two histograms. • Students write job descriptions and make a chart showing whether a person has done his job that day. • See also MATHEMATICS list: *Graphing; Scaling.* • See also SCIENCE and SOCIAL SCIENCE lists; *Communicating, Displaying Data.*
Working to Implement Solution(s) Chosen by the Class	• Students institute their plan of making the classroom neat and organized by distributing and carrying out classroom jobs.
Making Generalizations That Might Hold True under Similar Circumstances; Applying Problem-Solving Process to Other Real Problems	• Students recognize the need for fairness in distribution when there are desirable and undesirable tasks and objects involved. • Students recognize the need for cooperation and division of labor when there are many tasks to do. • Students apply skills acquired during work on Classroom Management to other real problems. • See also SCIENCE list: *Generalizing/Applying Process to New Problems.* • See also SOCIAL SCIENCE list: *Generalizing/Applying Process to Daily Life.*

ACTIVITIES IN CLASSROOM MANAGEMENT UTILIZING MATHEMATICS

Basic Skills

Classifying/Categorizing	• Organizing and classifying characteristics (e.g., length of time to perform) of particular classroom jobs. • Classifying the school day according to times that are busy or not busy. • See also SCIENCE list: *Observing/Describing; Classifying*. • See also SOCIAL SCIENCE list: *Observing/Describing/Classifying*.
Counting	• Counting hand votes to determine priorities of tasks. • Counting the number of students who wish to do various tasks, who wish a particular job, who like a particular rule, who forgot to do their job, who violated a classroom rule. • Counting opinion survey data on classroom job preferences, rules preference. • Counting spins on a spinner, names drawn from a container. • Counting number of seconds it takes to do a job, number of centimeters when making a paperholder, number of decibels when measuring noise levels. • Counting by sets to find scale for graph axes.
Computation Using Operations: Addition/Subtraction	• Using one-, two, or three-digit whole numbers to find total tally of opinion survey results (which rules are most important, classroom jobs that are desirable, schedules that are satisfactory), total number of rules violations. • Adding minutes and seconds when timing how long it takes a student to do a job each day for one week, how long each part of class day lasts, how long the noisy periods are. • Subtracting to find differences between estimated and actual votes for a specific job, schedule, or paper container design. • Subtracting one-, two-, or three-digit whole numbers to find ranges for graph axes or for timing data, such as how long each class period lasts.

Computation Using Operations: Multiplication/Division	• Multiplying to determine total area of an acoustical wall. • Multiplying whole numbers (total tally for each job times number of points assigned to each job rating) to determine total preference score for each job. • Using multiplication and division to increase or decrease measurements, such as for scale drawings of an organizer for class supplies. • Multiplying or dividing to find scale for graph axes. • Multiplying or dividing to convert from one unit of measure to another, such as seconds to minutes and vice versa. • Dividing measurements to determine number of units required to cover an area (e.g., number of rectangular egg cartons that will cover a designated area). • Dividing to calculate averages, such as the average number of times a rule is violated. • Dividing to calculate ratios, fractions, or percentages while tabulating data, e.g., percentage of students wanting various classroom changes.
Computation Using Operations: Fractions/Ratios/Percentages	• Using mixed numbers to perform calculations, such as determining measurements for classroom supplies organizer, determining average preference rating for each classroom job. • Using fractions in measurement, graphing, and graphic comparisons. • Changing fractions to higher or lower terms, to perform mathematical operations. • Using ratios to convert from inches to feet and vice versa. • Calculating percentages, e.g., percentage of students who desire a particular job, percentage for each classroom rule violated out of total number of violations. • Using slope diagrams to compare ratios.
Computation Using Operations: Business and Consumer Mathematics/Money and Finance	• Funding the total cost or cost per unit of the proposed classroom supplies organizer, of an acoustical barrier, etc. • Gaining experience with finance: sources, uses, and limitations of revenues for proposed projects. • Comparing costs of building materials at different stores.

Measuring	• Using different standard units, such as meters/centimeters, minutes/seconds. • Using different measuring tools, such as stopwatches, meter sticks. • Reading measuring devices accurately. • Timing with a stopwatch, such as to measure the length of time between classes, the amount of time to perform a job, or the length of time a noisy period lasts. • Taking repeated measurements, such as timings, and using the median to improve accuracy. • See also SCIENCE list: *Measuring/Collecting, Recording Data*. • See also SOCIAL SCIENCE list: *Collecting, Recording Data/ Measuring*.
Comparing	• Using the concept of *greater than* and *less than* in making comparisons, e.g., noise level before and after an acoustical barrier, number of rules violations before and after methods for enforcing rules has gone into effect. • Comparing quantitative data, e.g., individual timings in performing a job, costs of various building materials. • Comparing qualitative data, e.g., students' opinions on paperholder designs, on which jobs are desirable. • Comparing estimated and actual results, e.g., estimate of number of books or amount of papers that a desk organizer will hold vs. what the constructed organizer will hold, estimate of number of students desiring a given job vs. number who apply for it. • Comparing data graphically, e.g., bar graphs of opinion survey results, histograms of results using a spinner and drawing names from a container. • Comparing fractions and ratios using a slope diagram. • See also SCIENCE and SOCIAL SCIENCE lists: *Analyzing, Interpreting Data*.
Estimating/Approximating/ Rounding Off	• Estimating number of students who will forget to do their job, to obey classroom rules. • Estimating sizes, measurements, or numbers, e.g., number of books, amount of paper, or classroom supplies that an organizer will hold, number of acoustical barriers needed to lower noise level. • Determining when a measurement is likely to be accurate enough for a particular purpose. • Rounding off measurements to nearest whole number.

Organizing Data

- Tallying votes to determine priorities.
- Tallying opinion survey results on a chart form, e.g., student ratings of job difficulty, noise levels during designated times of school day.
- Recording times to do jobs and jobs completed on a chart form.
- Tallying spins on a spinner, names drawn from a container.
- Ordering average times to do jobs from smallest to largest.
- Ordering steps in a procedure, e.g., procedure for measuring noise levels.
- Ordering real numbers on graph axes.
- See also SCIENCE and SOCIAL SCIENCE lists: *Organizing, Processing Data.*

Statistical Analysis

- Determining a student's average time to perform a job, an average noise level during designated times in a day, an average number of rules violations per day.
- Determining the range of data, e.g., total scores of job ratings.
- Interpreting graphs: bar graph, cumulative distribution graph, histogram, line chart, line graph, Q-Q graph, scatter graph, slope diagram.
- See also SCIENCE and SOCIAL SCIENCE lists: *Analyzing, Interpreting Data.*

Opinion Surveys/Sampling Techniques

- Conducting opinion surveys (defining data collection methods, size and makeup of sample) on classroom jobs, rules, schedule, noise levels.
- Evaluating survey methods, data obtained, size and type of sample.
- See also SCIENCE and SOCIAL SCIENCE lists: *Analyzing, Interpreting Data.*

Graphing

- Using graphs to display data; making the graph form—dividing axes into parts, deciding on an appropriate scale.
- Representing data on graphs:
  - Bar graph--number of students who want various classroom jobs.
  - Conversion graph--converting inches to centimeters.
  - Cumulative distribution graph--percentage of students requiring five minutes or less to do a job.
  - Histogram--numbers of students taking different amounts of time to perform a classroom job.

Graphing (cont.)

  - Line chart--comparing two job timings over one week's time.
  - Line graph—noise level in the room at various distances from the source.
  - Q-Q graph--comparing sound level readings in the room at two different times.
  - Scatter graph—comparing preference ratings of a job vs. time required to do a job.
  - Slope diagram--comparing total scores of jobs rated in terms of difficulty to do vs. number of students rating each job.
- Obtaining information from graphs.
- See also SCIENCE and SOCIAL SCIENCE lists: *Communicating, Displaying Data*.

Spatial Visualization/Geomegry

- Drawing design of or constructing classroom supplies organizer, acoustical barrier.
- Constructing and using geometric figures, e.g., squares, rectangles to construct organizer.
- Using geometric figures to understand relationships, e.g., number of rectangular egg cartons that fit a designated area for acoustical barrier.
- Using standard mensurational formulas, e.g., computing the area of a rectangle.
- Using rulers, compasses, protractors when constructing.
- Using the concept of *greater than* and *less than* to compare geometric figures.

Areas of Study

Numeration Systems

- Using the metric system (decimal system) when making measurements for paper organizer, when converting centimeters to millimeters, when figuring dollars and cents.
- Using fractions in measuring length (inches, feet).
- See Computation Using Operations: *Fractions/Ratios/Percentages*.

Number Systems and Properties

- See *Computation Using Operations: Addition/Subtraction; Multiplication/Division; Fractions/Ratios/Percentages*.

Denominate Numbers/Dimensions

- See *Measuring*.

Scaling	- Making a scale drawing of classroom organizer, acoustical barriers. - Deriving information from scale drawing of classroom organizer. - Finding an appropriate scale (proportion) for the scale drawing.
Symmetry/Similarity Congruence	- See *Spatial Visualization/Geometry*.
Accuracy/Measurement Error/ Estimation/Approximation	- See *Measuring* and *Estimating/Approximating/Rounding Off*.
Statistics/Random Processes/ Probability	- See *Statistical Analysis*.
Graphing/Functions	- See *Graphing*.
Fraction/Ratio	- See *Computation Using Operations: Fractions/Ratios/ Percentages*.
Maximum and Minimum Values	- Minimizing noise levels in the classroom, inefficiencies in the class schedule, number of distractions and rules violations, disorganization and untidiness. - Determining a practical design for classroom supplies organizer that will hold maximum amount of supplies and occupy minimum amount of space.
Equivalence/Inequality/Equations	- See *Comparing* and *Computation Using Operations*.
Money/Finance	- See *Computation Using Operations: Business and Consumer Mathematics/Money and Finance*.
Set Theory	- See *Classifying/Categorizing*.

ACTIVITIES IN CLASSROOM MANAGEMENT UTILIZING SCIENCE

Process	
Observing/Describing	• Observing and describing the effects of noise on classroom activities. • Describing the various noises in the room that cause distractions. • Observing and describing the physical layout of the classroom to show sources of noise, to show disorganization and untidiness. • Observing and describing the effectiveness of various kinds of sound insulating material, of various designs of structures for the supplies organizer. • See also SOCIAL SCIENCE list: *Observing/Describing/Classifying.*
Classifying	• Classifying various parts of the classroom as noisy or quiet. • Classifying building and sound insulating materials according to some criteria, e.g., strength, durability, effectiveness, cost, feasibility. • See also MATHEMATICS list: *Classifying/Categorizing.* • See also SOCIAL SCIENCE list: *Observing/Describing/Classifying.*
Identifying Variables	• Identifying the time of day as a variable in describing noise levels in the room. • Identifying time of day as variable to be controlled when testing different sound-absorbing structures. • Identifying noise levels as a variable affecting student behavior and work habits. • Identifying different acoustical materials and designs as variables to be changed in determining a good soundproof structure. • Identifying materials used and designs as variables to be changed in determining a strong and useful supplies organizer. • Identifying structure of spinner device as a variable in determining its use for fair choices. • See also SOCIAL SCIENCE list: *Identifying Problems, Variables.*

Defining Variables Operationally	• Defining time of day as that given by the classroom clock. • Defining noise level as that measured by the VU-meter on a tape recorder when the volume is set at five. • Defining effectiveness of acoustical (sound-absorbing) materials in terms of the reduction in noise level that they produce. • Defining a fair method of job distribution as one where every student's name has an equal chance of being chosen.
Manipulating, Controlling Variables/ Experimenting.	• Measuring noise levels with various sound-absorbing structures installed at the same time of the day. • Experimenting with different building materials and different designs to determine which would be the best for the supplies organizer or sound-absorbing structure. • See also SOCIAL SCIENCE list: *Manipulating, Controlling Variables/Experimenting*.
Designing and Constructing Measuring Devices and Equipment	• Constructing devices to measure sound levels in various parts of the classroom. • Constructing sound-absorbing structures or supplies organizers.
Inferring/Predicting/Formulating, Testing Hypotheses/Modeling	• Hypothesizing that the noise level in the room is high during certain times of the class day. Testing hypothesis by taking noise level measurements at those times of day. • Predicting that sound-absorbing structures places in various areas of the room will help reduce the noise level. Constructing such structures and measuring noise level to find out. • Predicting that a supplies organizer will help the classroom to run more smoothly. Constructing one to find out. • See also SOCIAL SCIENCE list: *Inferring/Predicting/ Formulating, Testing Hypotheses*.
Measuring/Collecting, Recording Data	• Using a sound level meter to measure noise levels every hour and recording the readings on a chart. • Using a sound level meter to measure noise levels when different sound-absorbing structures are in place. • Measuring and recording the length of time it takes students to perform classroom jobs; the amount of time the

Measuring/Collecting, Recording Data (cont.)	class spends on each class activity or between each class activity. • Measuring the area in which the supplies organizer or sound-absorbing structure is to fit. • Measuring strength of different materials that are to be used in constructing supplies organizer or sound-absorbing structure. • Measuring various building materials when constructing the supplies organizer or sound-absorbing structure. • Researching information on sound and sound absorption. • See also MATHEMATICS list: *Measuring.* • See also SOCIAL SCIENCE list: *Collecting, Recording Data/ Measuring.*
Organizing, Processing Data	• Ordering data on noise levels from smallest to largest. • Tabulating measurements of the sound-absorbing structure or supplies organizer before making it. • See also MATHEMATICS list: *Organizing Data.* • See also SOCIAL SCIENCE list: *Organizing, Processing Data.*
Analyzing, Interpreting Data	• Determining which sound-absorbing structure is most effective in reducing noise. • Determining which supplies organizer is most useful. • Determining the times of the day when the average noise level is highest or lowest. • Calculating average times, e.g., average time to do a job, average time for a class activity. • See also MATHEMATICS list: *Comparing; Statistical Analysis; Opinion Surveys/Sampling Techniques; Graphing; Maximum and Minimum Values.* • See also SOCIAL SCIENCE list: *Analyzing, Interpreting Data.*
Communicating, Displaying Data	• Making bar graphs of noise level data, data on strength of various materials. • Showing measurements of supplies organizer, sound-absorbing structure in drawings. • See also SOCIAL SCIENCE list: *Communicating, Displaying Data.* • See also LANGUAGE ARTS list.

Generalizing/Applying Process to New Problems	• Applying observational and data collection skills to other real problems. • Applying skills learned from working on a classroom problem to help solve other classroom problems or problems elsewhere in the school, such as the lunchroom. • See also SOCIAL SCIENCE list: *Generalizing/Applying Process to Daily Life*.

Areas of Study

Measurement	• Measuring various classroom areas to determine size of sound-absorbing structure or supplies organizer using meter sticks, tape measures, and rulers. • Using stopwatches to determine amount of time to perform a job, amount of time required for various class activities, amount of time between class activities. • Measuring sound levels using homemade or commercial instruments. • Measuring strength of materials. • See also MATHEMATICS list: *Measuring*.
Force	• Observing that force must be exerted to use a handsaw. • Observing that saber saws are faster and require less effort to operate than handsaws when cutting Tri-Wall or lumber. • Observing that force is required to hammer nails into wood.
Friction	• Observing that a piece of wood becomes warm when sanded or that a saw blade becomes warm when a piece of wood is sawed vigorously. • Observing that some objects, such as pencils, roll if the supplies organizer's shelves are not level while other objects, such as a book, do not.
Weight	• Observing the effects of gravity (weight) while hanging a sound-absorbing structure. • Observing that different materials have different weights.
Mechanical Work and Energy	• Observing that energy is needed to use handsaws and to hammer nails into wood.

Mechanical Work and Energy (cont.)	• Observing that electrical energy is transformed into mechanical energy when power tools are used. • Observing that mechanical energy is transformed into heat energy when wood is sanded. • See also *Force*.
Solids, Liquids, and Gases	
States of Matter	• Observing that glue is available in liquid or solid form with different properties. • Observing that a glue gun turns a cool stick of glue into a hot liquid glue.
Properties of Matter	• Observing that different construction materials, such as lumber and Tri-Wall, have different properties that make them useful for different tasks. • Observing the effects of physical wear over a period of time on materials. • Observing that glues, lumber, paper, and other materials have particular odors. • Observing that different materials absorb sound to different degrees: solid, dense materials tend to transmit sound well; soft or porous materials tend to make better soundproofing because they absorb sound.
Electricity	• Observing that plugging in a tape recorder enables the equipment to be turned on. • Observing that tape recorders, saber saws, and other electrically powered devices go on when the switch is closed and go off when the switch is open. • Observing that electrical energy can be transformed into mechanical energy (tape recorder, saber saw) or into heat energy (glue gun).
Sound	• Measuring noise levels using professional sound-level meters or tape recorder meters. • Observing that noise from the hallway can often be heard in the classroom. • Observing that some of the electrical energy supplies to power tools is transformed into sound energy (noise). • Observing that sounds differ in tone, pitch, loudness, and quality.

Sound (cont.)

- Observing that noise levels in the classroom are lower when acoustical barriers are used to absorb the sound.
- Observing that a sound becomes less intense as one moves away from its source.
- Observing that sound readily travels around objects.

Process	
Observing/Describing/Classifying	• Observing and describing the affects of disorganization and untidiness, a poor class schedule, or lack of classroom rules on student behavior and work habits. • Classifying classroom problems. • Organizing and classifying sets of ideas or information on ways to change the classroom. • Classifying jobs, rules, and schedules in terms of desirability. • Classifying classroom rules in terms of effectiveness. • See also MATHEMATICS list: *Classifying/Categorizing*. • See also SCIENCE list: *Observing/Describing; Classifying*.
Identifying Problems, Variables	• Identifying method of assigning classroom jobs, rules, and scheduling as problems to be solved. • Identifying variables in jobs--difficulty, amount of time to perform, frequency with which job must be done, and job popularity. • Identifying variables in scheduling. • See also SCIENCE list: *Identifying Variables*.
Manipulating, Controlling Variables/ Experimenting	• Devising tests to determine job difficulty, time to perform. • Trying out various ways to perform jobs or various schedules for performing jobs. • Trying out various class schedules. • Comparing the various methods used for encouraging students to obey classroom rules. • See also SCIENCE list: *Manipulating, Controlling Variables/Experimenting*.
Inferring/Predicting/Formulating, Testing Hypotheses	• Inferring from observations that the present way of handling classroom jobs is ineffective. • Inferring from the opinion survey results that some classroom jobs are more popular than others, that some rules are considered more important than others, that one supplies organizer design is more popular. • Predicting that student behavior and work habits will improve when the noise is decreased.

Inferring/Predicting/Formulating, Testing Hypotheses (cont.)	• Hypothesizing that the class will run more smoothly with classroom jobs, a supplies organizer, and a more efficient class schedule; testing hypothesis by utilizing the best method for distributing jobs, the best class schedule, the best supplies organizer design. • See also SCIENCE list: *Inferring/Predicting/Formulating, Testing Hypotheses/Modeling*.
Collecting, Recording Data/ Measuring	• Using voting procedure to determine preferences for supplies organizer design, etc. • Administering an opinion survey on classroom job preference or rules. • Administering tests to determine job difficulty. • Observing frequency of performing jobs. • Measuring time to perform jobs. • See also MATHEMATICS list: *Measuring*. • See also SCIENCE list: *Measuring/Collecting, Recording Data*.
Organizing, Processing Data	• Ordering tasks that need to be done in terms of priority. • Tallying votes and opinion survey data. • Ordering jobs and rules in order of student preference based on opinion survey results. • Ordering averages of job timings from smallest to largest. • See also MATHEMATICS list: *Organizing Data*. • See also SCIENCE list: *Organizing, Processing Data*.
Analyzing, Interpreting Data	• Determining jobs and rules preferred by using a rating scale on survey results. • Determining jobs that take longest time, next longest time, etc. • Establishing equality of jobs in terms of popularity, time to perform, frequency, difficulty. • Evaluating survey methodology, size and makeup of sample. • See also MATHEMATICS list: *Comparing; Statistical Analysis; Opinion Surveys/Sampling Techniques; Graphing; Maximum and Minimum Values*. • See also SCIENCE list: *Analyzing, Interpreting Data*.
Communicating, Displaying Data	• Representing survey data on graphs or charts. • Representing frequency and times of jobs and job difficulty on graphs.

Communicating, Displaying Data (cont.)	• Recording observations of classroom activities on a chart. • See also MATHEMATICS list: *Graphing.* • See also SCIENCE list: *Communicating, Displaying Data.* • See also LANGUAGE ARTS list.
Generalizing/Applying Process to Daily Life	• Understanding that rules, jobs, and an efficient schedule are necessary for a smooth-running classroom. • Using knowledge of making rules and devising an efficient schedule on similar problems that may exist in the school (i.e., lunchroom). • Using knowledge of devising efficient schedules and of organizing to improve individual's daily life and productivity. • See also SCIENCE list: *Generalizing/Applying Process to New Problems.*

Attitudes/Values

Accepting Responsibility for Actions and Results	• Making sure that small group tasks (e.g., conducting surveys, measuring noise levels, timing job tasks) are done. • Scheduling and making necessary arrangements for trips to building suppliers. • Being responsible for actions while outside the classroom.
Developing Interest and Involvement in Human Affairs	• Promoting changes in the classroom so that it will be a more pleasant place. • Investigating ways to distribute classroom jobs fairly. • Providing a set of classroom rules that students feel are important so that the room will be safe and so that the class will function more smoothly. • Providing an efficient class schedule, supplies organizer so that students may function more effectively.
Recognizing the Importance of Individual and Group Contributions to Society	• Recognizing that they can improve conditions in the classroom. • Assessing the effects of group action on classroom conditions.

Developing Inquisitiveness, Self-Reliance, and Initiative	• Conducting small and large group sessions with some teacher assistance. • Resolving procedural problems that may arise during the course of activities. • Learning to use different ways to obtain needed information, e.g., opinion surveying, using the telephone. • Dealing with local merchants in obtaining building supplies.
Recognizing the Values of Cooperation, Group Work, and Division of Labor	• Recognizing the efficiency of small group work (e.g., conducting opinion surveys, constructing, measuring noise levels). • Finding that work proceeds smoothly when everyone cooperates.
Understanding Modes of Inquiry Used in the Sciences, Appreciating Their Power and Precision	• Identifying and defining a problem; being able to distinguish it from a related but secondary problem. • Recognizing the importance of obtaining student opinions about the classroom rules, jobs, schedule, supplies organizer. • Determining the best way to collect opinion data. • See also MATHEMATICS and SCIENCE lists.
Respecting the Views, Thoughts, and Feelings of Others	• Considering all suggestions and opinions from members of a group and from the class and assessing their merit. • Recognizing and respecting differences in values due to many variables such as sex, age, experience.
Being Open to New Ideas and Information	• Considering alternative ways of doing various tasks. • Asking other people for opinions, ideas, and information.
Learning the Importance and Influence of Values in Decision Making	• Realizing that cost effectiveness alone is not sufficient in considering a solution; effects on people must also be considered. • Recognizing that opinion differences reflect value differences. • Recognizing that different groups may have different needs for various classroom rules.

Areas of Study	
Economics	• Using economics concepts and terms such as cost, wholesale price, retail price when building the supplies organizer or sound-absorbing structure. • Gaining experience with finance: sources, uses, and limitations of revenues for the purchase of materials for the classroom. • Gaining experience in recordkeeping and comparative shopping for materials. • Assessing preferences, characteristics, etc., of users (i.e., classmates) through surveys or questionnaires.
Geography/Physical Environment	• Investigating and changing the physical environment in the classroom.
Political Science/Government Systems	• Setting up a system to enforce classroom rules. • Investigating systems of administration and control. • Investigating regulations and policies affecting planned changes in the classroom. • Getting in touch with and working with school authorities to obtain permission to carry out room improvements.
Recent Local History	• Investigating previous attempts to change the classroom.
Social Psychology/Individual and Group Behavior	• Recognizing and using different ways of approaching different groups. (Using a different approach for fellow students from that for a school principal.) Finding "best" ways to approach the principal or teacher about approval for suggested room improvements. • Recognizing the need for leadership within small and large groups. Recognizing differing capacities of individuals for various roles within groups. • Analyzing the effects of a small group making decisions for a larger group.
Sociology/Social Systems	• Considering the integral, related nature of a community and its physical or recreational surroundings as a factor in the problem of making the classroom a better place. • Devising a system of working cooperatively in small and large groups.

Sociology/Social Systems (cont.)

- Investigating problems and making changes that affect not only themselves, but society (other students in the school).
- Working within established social systems to promote changes within the classroom.
- Experiencing and understanding differences in social systems in different social groups (children, adults, women, men).
- Recognizing that there are many different social groups and that one person belongs to more than one social group.

ACTIVITIES IN CLASSROOM MANAGEMENT UTILIZING LANGUAGE ARTS

Basic Skills

Reading: Literal Comprehension--Decoding Words, Sentences, and Paragraphs	• Decoding words, sentences, and paragraphs while reading books on sound, catalogs of building materials; while reading rules and schedules.
Reading: Critical Reading--Comprehending Meanings, Interpretation	• Obtaining factual information about sound and building materials. • Understanding what is read. • Interpreting what is read. • Critically analyzing the wording of their proposed classroom rules.
Oral Language: Speaking	• Offering ideas, suggestions, and criticisms during discussions in small groups and class discussions on problems and proposed solutions. • Reporting group activities to the class; responding to criticisms and comments. • Using the telephone properly and effectively to obtain information from local merchants or to invite a resource person to speak to the class. • Making an oral presentation of proposed plans for sound-absorbing structures to the principal.
Oral Language: Listening	• Listening to group reports and to ideas, suggestions, and criticisms of other students. • Following spoken directions. • Conducting interviews of classmates.
Written Language: Spelling	• Using correct spelling in writing reports, rules, schedules; on charts and on signs.
Written Language: Grammar--Punctuation, Syntax, Usage	• Using rules of grammar in writing.

Written Language: Composition	• Writing to communicate effectively: • writing opinion surveys; devising questions to elicit desired information; judging whether a question is relevant and whether its meaning is clear. • preparing reports using notes, data, and graphs. • preparing posters, charts, signs for the classroom.
Study Skills: Outlining/Organizing	• Taking notes when consulting local merchants or authorities on building supplies, sound. • Developing an opinion survey; ordering the questions in a logical sequence and around central themes. • Organizing data, ideas, facts for inclusion in a report or presentation. • Planning and preparing possible class schedules.
Study Skills: Using References and Resources	• Using the dictionary for correct spellings and for determining word meanings. • Using the library or consulting authorities to determine ways to decrease noise levels in the room, ways to build structures. • Talking with the teacher and classmates to determine the effectiveness of new schedules, rules, or jobs.

Attitudes/Values

Appreciating the Value of Expressing Ideas Through Speaking and Writing	• Finding that written materials, such as opinion surveys or charts on the wall, evoke responses from classmates. • Finding that classmates, teacher, or principal respond to ideas when they are presented clearly.
Appreciating the Value of Written Resources	• Finding that desired information can be found in written resources, such as dictionary, library books, catalogs.
Developing an Interest in Reading and Writing	• Seeking out written resources that will help solve a problem.
Making Judgments Concerning What is Read	• Deciding which rules that are submitted by classmates are really relevant to the class.

Making Judgments Concerning What is Read (cont.)	• Deciding which sound-absorption method explained in a book is practical and feasible for the classroom. • Evaluating opinion surveys, reports, schedules and rules to determine whether they say what they are supposed to say.
Appreciating the Value of Different Forms of Writing, Different Forms of Communication	• Finding that how information can be best conveyed is determined in part by the audience to whom it is directed. • Finding that certain data or information can be best conveyed by writing it down or by preparing graphs or charts. • Finding that certain data or information should be written down so that it can be referred to at a later time. • Finding that an oral presentation may be better in some cases, while a written letter or report may be better in others.